Each coach has specific job role and targets.

Presentation Overview

- What is the England World Class Squash Programme
- What is the English Institute of Sport (EIS)
- How does the EIS work within the World Class Programme
- What is Performance Analysis
- How Performance Analysis works with Squash
  - Demands of the game
  - Replication Shooting
  - Tactical Profiling
  - Momentum Analysis
  - Perturbations in Squash
- Conclusion and Questions (throughout please!)

What is the England World Class Squash Programme?

- A national programme funded by Sport England (circa £1 million)
- A centralised programme based at Head office and National Centre in Manchester
- Employs / funds players, management, and coaches:
  - Players
    - Juniors (up to U17): 6 male and female each age group
    - Senior: 18 total
  - Senior: 18 total
- Management
  - Performance Manager
  - Performance Administrator
- Coaches
  - 29 part-time development coaches
  - 8 part-time regional coaches
  - 3 full-time high performance coaches
  - 1 National Coach

Aims of this session....

1. Describe the England World Class Squash Programme
2. Outline how Sports Science Works within Squash
3. Demonstrate Examples from within Performance Analysis

Ethos of England Squash World Class Programme

- The simple aim is to be the best in the World both individually and team
- Funding is target based – reviewed every 4 years
- Each player has specific targets – reviewed formally every 6 months (monitored monthly)
- Each coach has specific job role and targets – reviewed annually
- Formal contract between the player and the programme
- Agreed targets
- Ensure Buy-in to ethos of programme
- Conduct expectations...always representing England!
- If these targets are not hit then changes are made with immediate effect...not to be cut throat, but our funding dictates this (regardless of status of player)
What is the English Institute of Sport?

- A nationwide sports science delivery system
- Works with over 40 sports (including Olympic and professional)
- 240+ members of staff
- 9 centres around the country
- What does this mean for squash:
  - Around £150k PA investment
  - Central and National Support
  - 3 FTE members of staff
  - 24 hour cover
  - Delivery of all sports science disciplines

THE EIS ETHOS

EIS Mission Statement:

“...........Sustained international success in sport for England through the delivery of world class, integrated, and innovative support services”

How does the EIS work within the England Squash World Class Programme
Performance Analysis is an **objective way of recording** performance so that **key elements** of that performance can be **quantified** in a valid and consistent manner (Hughes and Franks, 1997).

- Coaching used to be based solely upon subjective interventions.
- Franks & Goodman (1983) found that NGB coaches could only remember 30% of key events.
- Generally performers can only correctly recall 20-25% of their own performances.

Where does PA come from:

- **NOTATIONAL / VIDEO ANALYSIS**
  - Systematic Observations
  - Objective Analysis
  - Improved Interventions
  - Improved Feedback

- **SPORTS BIOMECHANICS**

General Aims of PA in squash:

- **OBJECTIVE FEEDBACK**
- **ENHANCE COACHING PROCESS**
- **QUANTIFY WEAKNESSES**
The importance of observation, feedback and learning

- Feedback is the most important variable in developing skill and should be based on systematic observation (Performance Analysis).
- Formal intervention (coaching) when based on intuitive/subjective observation is unlikely to be a powerful enough tool to account for improvement.
- The quality and precision of feedback is vital to developing skill in elite athletes.
- Techniques of video feedback and statistical analysis have been shown to influence learning and skill development.

Modes of Performance Analysis

Two modes of applying Performance Analysis:

1. Real-time
   - Simple analyses
   - Observation/P.W.

2. Lapsed-time
   - Post Activity
   - Very detailed analyses
   - Analysis of all aspects

The Role of Performance Analysis

Role is to provide objective and quantified performance information to the coach and to the athlete, with the coach.

Numerical data (KR)
Visual data (KP)

EIS PA Software Continuum

Macro Analysis

Micro Analysis

Exemplar Projects
Example 1. Demands of the Elite Game

Defining the Elite game

- Objectively describe the demands of the game
- Interrogate the dogma
- Better inform the Coaching and Sports Science Process

PSA New Scoring System

- Brought into Men’s game 2003
- Reduced from 15 to 11 points
- Aim to increase ‘attacking’ play
- Previous research still applicable?
- Observation and effect of changes

Findings on new scoring system

<table>
<thead>
<tr>
<th>General Data</th>
<th>15 Scoring</th>
<th>11 Scoring</th>
<th>Mann-Whitney</th>
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<tbody>
<tr>
<td>Number of Matches</td>
<td>100</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>Number of Games</td>
<td>400</td>
<td>400</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Per Game Data</th>
<th>Average</th>
<th>Average</th>
<th>Difference</th>
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<tbody>
<tr>
<td>Rallies per Game</td>
<td>33.90</td>
<td>26.52</td>
<td>0.001</td>
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<tr>
<td>Shots per Rally</td>
<td>13.90</td>
<td>66.41</td>
<td>0.006</td>
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<tr>
<td>Average Rally Length</td>
<td>13 mins</td>
<td>19 mins</td>
<td>0.000</td>
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<tr>
<td>Time Between Rallies</td>
<td>12 secs</td>
<td>15 secs</td>
<td>0.671</td>
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<tr>
<td>Ball in Play</td>
<td>9 mins 33 secs</td>
<td>9 mins 01 secs</td>
<td>0.262</td>
</tr>
<tr>
<td>Total Game Time</td>
<td>16 mins 27 secs</td>
<td>14 mins 39 secs</td>
<td>0.040</td>
</tr>
<tr>
<td>% Ball in play</td>
<td>59%</td>
<td>64%</td>
<td>0.004</td>
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</table>

Average Tournament Data

<table>
<thead>
<tr>
<th>Men</th>
<th>Women</th>
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<tbody>
<tr>
<td>Q1</td>
<td>45</td>
</tr>
<tr>
<td>Q2</td>
<td>47</td>
</tr>
<tr>
<td>R1</td>
<td>45</td>
</tr>
<tr>
<td>R2</td>
<td>51</td>
</tr>
<tr>
<td>L8</td>
<td>54</td>
</tr>
<tr>
<td>L4</td>
<td>59</td>
</tr>
<tr>
<td>Final</td>
<td>45</td>
</tr>
</tbody>
</table>

Therefore, to win a major Men’s event (32 draw) you will play 269 minutes (4.5 hours), in five days, to win a major Women’s event you will play 233 minutes (3.9 hours) squash over 5 days – both with no rest day!
Distribution of Matchplay

- 10% 9%
- 47% 33%

Types of Movement

- Long 10%
- RIP 9%
- Step 83%
- Out of box 83%
- 2 Period 68%
- Long 30%

Match HR Data

- Heart Rate (bpm)
- Time (min)

Elite Squash Analysed:

- Creation of Elite Template
- Establish Norms of Performance
- Understand Demands of the Elite Game

Example 2. Replication Ghosting

- Replication of match play movement patterns
- Movements done without the ball
- Repetitive patterns of movement to cover all areas of the court
- See clip...
**Rationale Behind Ghosting**

1. Match Specific Conditioning (high correlation between the physical demands of ghosting and match play)
2. Replication of movement demands and movement patterns
3. Technical Reinforcement
4. See clip....

**Current Limitations of Ghosting**

1. Not loaded towards match specific game play i.e. distribution of movement and individual variation
2. Not situation / player specific i.e. Patterns of Movement
3. Weaker patterns are not emphasised
4. Consistency of training (boredom through repetition = low adherence)
5. See Methodology Example

**Validation and Initial Findings**

**Further Findings**

**Uses of Replication Ghosting**

1. Replay specific strength’s and weaknesses
2. Replay specific situations / opponent’s
3. Play a higher level of match play (Junior’s understand the hard mentality required)
4. Test Squash Specific Fitness

Stimulate the training environment, NM e.g.

**Example 3. Tactical Profiling**
Know your enemy as you know yourself and you need not fear one hundred battles;

know yourself but not the enemy,
for every victory gained you will also suffer a defeat;

know neither the enemy nor yourself and you will succumb in every battle.

(Sun Tzu, 652)

SWEAT Analysis
Simple Winner to Error Analysis Technology
(based on a hand system by Professor Mike Hughes, UWIC)

Real Time Data Collection

Data is gathered into a Microsoft Access Database

- Allows analysis of distribution, frequency and type of rally ending shot
- Data is processed real time for viewing between games

Overall Winner / Error ratio

Game Winner / Error ratio

Rally Length Winner / Error ratio
Hughes, Wells & Murray (2000) showed that in elite level squash it took 5-6 matches for the profiles to stabilise.

"Statistics are like a mini skirt... they give you an idea ... but they hide the best bits."

Ebbe Skovdahl, ex-Manager, Aberdeen FC
FOCUS X2
- Visual examples to support live data
- Can immediately recall clips pertinent to the 'Hot Spots' and 'Danger Zones'
- Provides visual data to coaches to conceptualise data

See It live....

Example 4. Momentum Analysis

2 Player Momentum

Example 5. Perturbations

See It live....
A perturbation exists in an open system where the usual rhythmic play is disturbed by extreme elements of high or low skill, which consequently result in a particular outcome (Hughes and Reed, 2005).

Example Male Results

| Type of shot that caused a perturbation when playing a squash match. |

Graph to show whether a player was likely to win off perturbations when they caused them or whether they were more likely to win off them, when their opponent caused them.

Conclusions

- Scientific – Applied – Sport / Coach led
- The athlete should never be a victim of a coach’s limitations – same with analysts (create simple messages)
- Tools for your needs, budgets (pen and paper) and preferences
- Systems do not replace good coaching, just assist and back up beliefs.
- Not just video footage collector – integral to coaching process
- Making a performance impact
- Thank you for your attention

“If it ain’t broke, don’t fix it”
“If you always do what you always did, you’ll always get what you always got”