



England Squash & Racketball

09

**Sports Science and Coaching within the England Squash Elite Programme:**

David Pearson – England National Squash Coach  
Stafford Murray – Head of PA and Biomechanics, EIS  
Hong Kong 22.05.09

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**Alms 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

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**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 Ghosting
  - Tactical Profiling
  - Momentum Analysis
  - Perturbations in Squash
- Conclusion and Questions (throughout please!)

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**What is the England Squash World Class Programme?**

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**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
    - Transitional (up to 23 years old) : 20 total
    - Senior : 18 total
  - Management
    - Performance Manager
    - Performance Administrator
  - Coaches
    - 20 part-time development coaches
    - 8 part-time regional coaches
    - 2 full time high performance coaches
    - 1 National Coach

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**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
  - Agree 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).....

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## What Is the English Institute of Sport?

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## 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.....

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## THE EIS ETHOS

EIS Mission Statement.....

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

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APPLIED SERVICE PROVISION

GREY ZONE

ACADEMIC RESEARCH

ripple RESEARCH tsunami

Funding, Duration, Complexity, Equipment

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## EIS Video Example

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## How does the EIS work within the England Squash World Class Programme

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## What Is Performance Analysis

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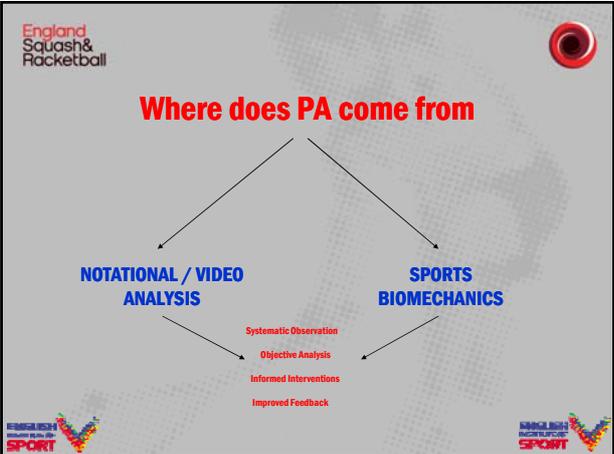
### Definition

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)

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### Roots of Performance Analysis

- 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



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### General Aims of PA in squash.....

- IMPROVE TECHNIQUE
- OBJECTIVE FEEDBACK
- IMPROVETACTICS
- 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**

## Analysis in the Coaching Process

(Franks et al, 1983)

```

    graph TD
        AP[Athlete Performance] --> CO[Coach Observes]
        CO --> CP[Coach Plans practice]
        CP --> CC[Coach conducts practice]
        CC --> AP
        CO --> AP
        CO --> CP
        CP --> CO
        CC --> CP
        CC --> AP
        CO --- Q((?))
        Q --- CP
        CP --- PR[70%]
        PR --- CC
        CC --- PR2[30%]
        PR2 --- CP
    
```

## Modes of Performance Analysis

Two modes of applying Performance Analysis:

*During Activity*

*Simple Analyses*

*Immediate F/B*

**1. Real-time**

*Post Activity*

*Very detailed Analyses*

*Analysis of all aspects*

**2. Lapsed-time**

## 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**

Match Analysis, Patterns of Play, Tactics, etc

**Micro Analysis**

Technical Analysis, Applied Sports Biomechanics, Movement Analysis, etc

Reynolds Notation Systems	Pinnacle Liquid Editions	Focus X2	Dartfish	Quintic	Laser Laser	Midas Cameras
Hand or Computer. Tailored to Coach's needs.	Digital Editing System. DVD Production	Video Linked Performance Analysis System	Technical Video Analysis System	Technical / Biomechanical Video Analysis System	Real Time Velocity 'Laser'	High Speed Camera 'zooming' expensive

## 5 Performance Analysis Exempler Projects

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### Example 1. Demands of the Elite Game

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### Defining the Elite game

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

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### Defining the Elite game

- Establish Norms of Elite Performance
- Examine effects of new scoring system
- Demands of elite tournament match play
- Distribution of movement and movement type
- Physical demands of the game

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### 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

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### Findings on new scoring system

General Data	15 Scoring	11 Scoring	
Number of Matches	100	100	
Number of Games	400	400	
Per Game Data	Average	Average	Mann Whitney
Rallies per Game	33.80	26.72	0.001
Shots per Rally	11.90	14.41	0.006
Average Rally Length	17 secs	20 secs	0.008
Time Between Rallies	12 secs	13 secs	0.671
Ball in Play	9 mins 33 secs	9 mins 01 secs	0.262
Total Game Time	16 mins 27 secs	14 mins 36 secs	0.025
% Ball in play	57%	62%	0.026

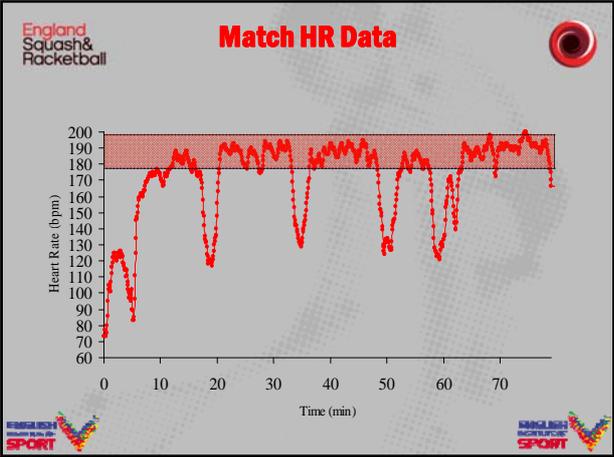
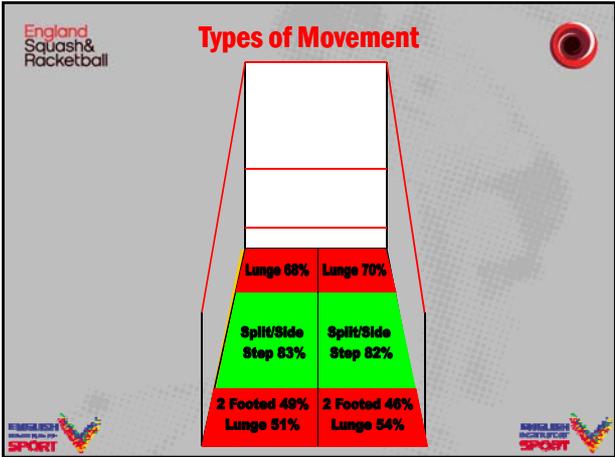
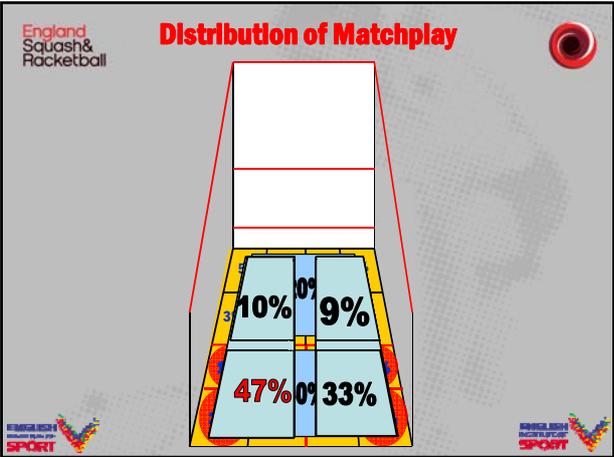
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### Average Tournament Data

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!**

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- ### Elite Squash Analysed:
- Creation of Elite Template
  - Establish Norms of Performance
  - Understand Demands of the Elite Game
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### Example 2. Replication Ghosting

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- ### What is Ghosting....
1. Replication of match play movement patterns
  2. Movements done without the ball
  3. Repetitive patterns of movement to cover all areas of the court
  4. [See clip....](#)
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## 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....](#)

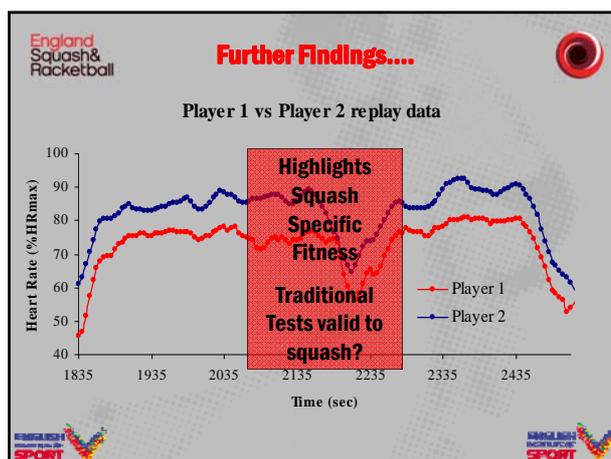
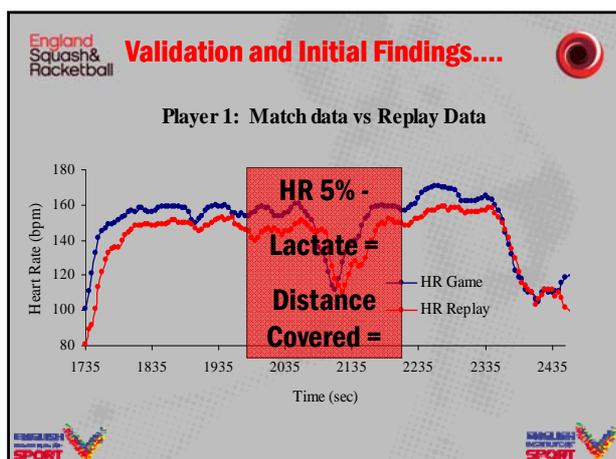



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## Current Limitations of Ghosting....

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](#)





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## 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..**




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## Example 3. Tactical Profiling




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## The mission behind 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)




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# SWEAT Analysis

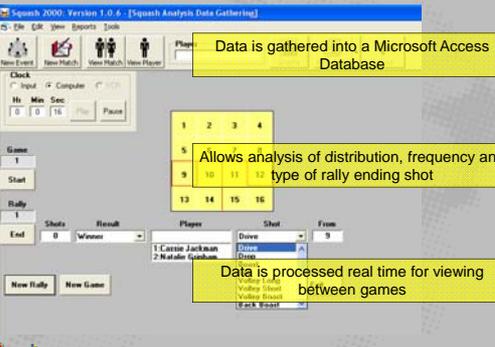
Simple Winner to Error Analysis Technology

(based on a hand system by Professor Mike Hughes, UWIC)




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## Real Time Data Collection



Data is gathered into a Microsoft Access Database

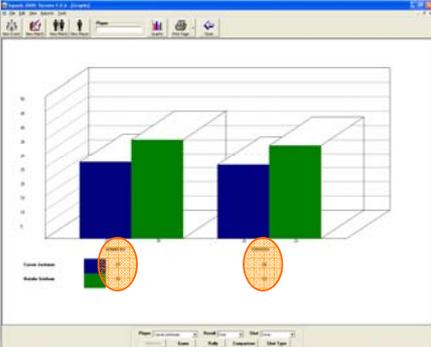
Allows analysis of distribution, frequency and type of rally ending shot

Data is processed real time for viewing between games




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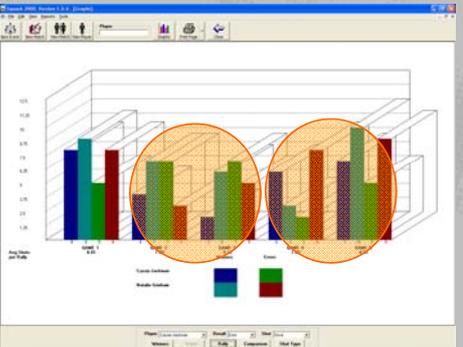
## Overall Winner / Error ratio





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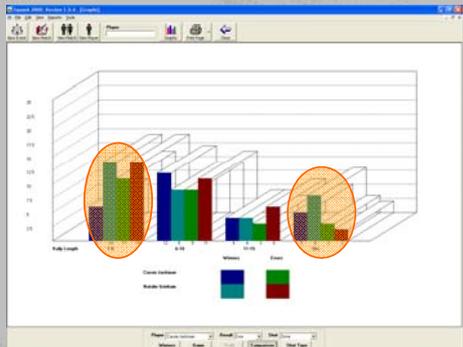
## Game Winner / Error ratio



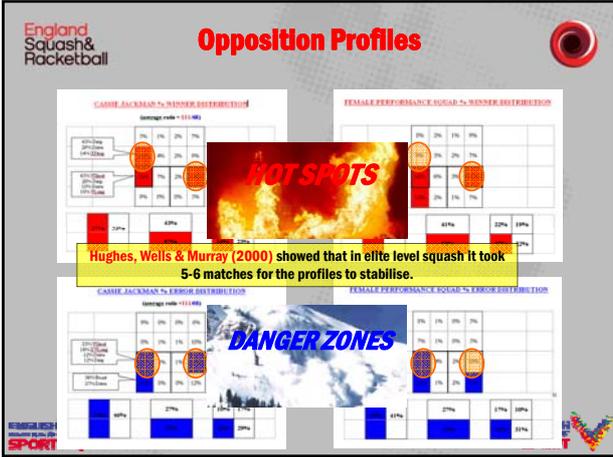
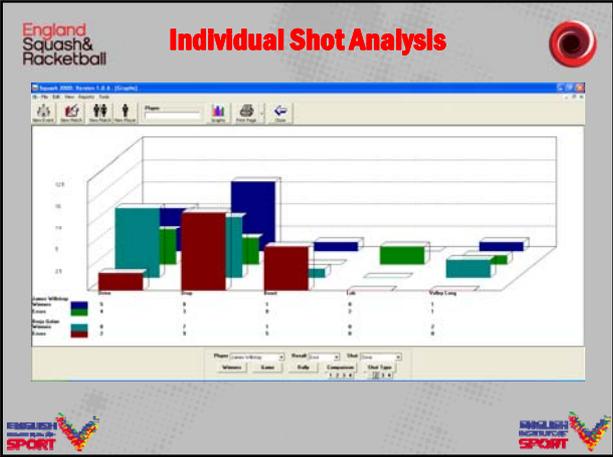
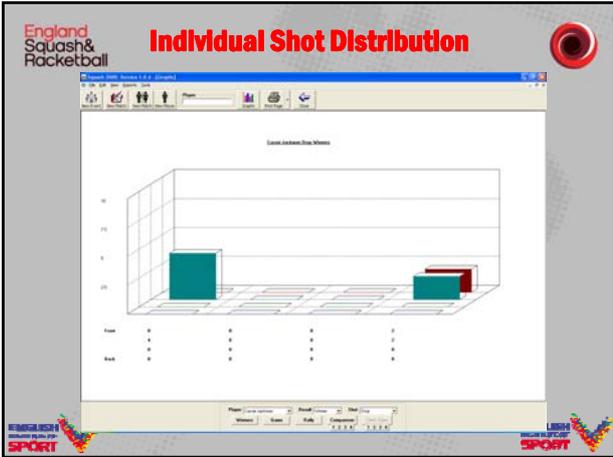
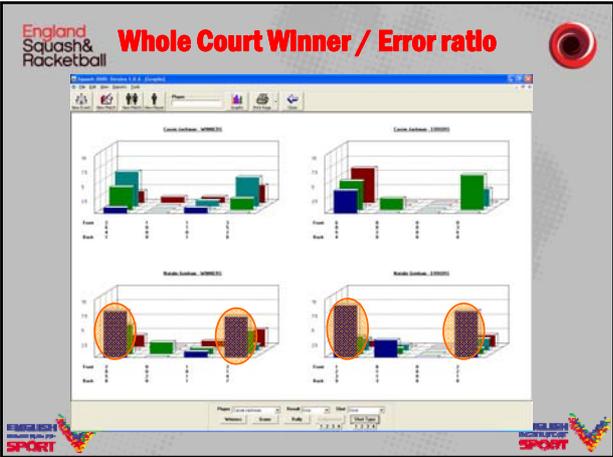


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## Rally Length Winner / Error ratio







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**See It Live.....**

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

Ebbe Skovdahl, ex-Manager, Aberdeen FC

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### FOCUS X2

- Visual examples to support the data
- Can immediately recall clips pertinent to the 'Hot Spots' and 'Danger Zones'
- Provides Visual data for coaches to conceptualise data

The screenshot shows a video player on the left with a red overlay on a squash court. To the right is a data table with columns for 'Player', 'Shot Type', 'Shot Location', 'Shot Direction', and 'Shot Speed'. Below the table are several green buttons for data analysis.

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### See It Live.....

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### Example 4. Momentum Analysis

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### 2 Player Momentum

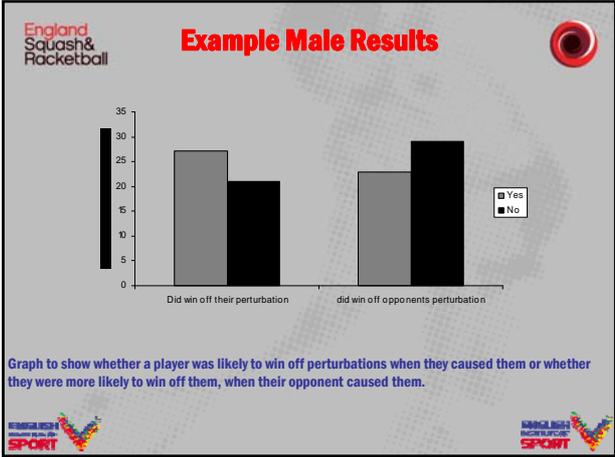
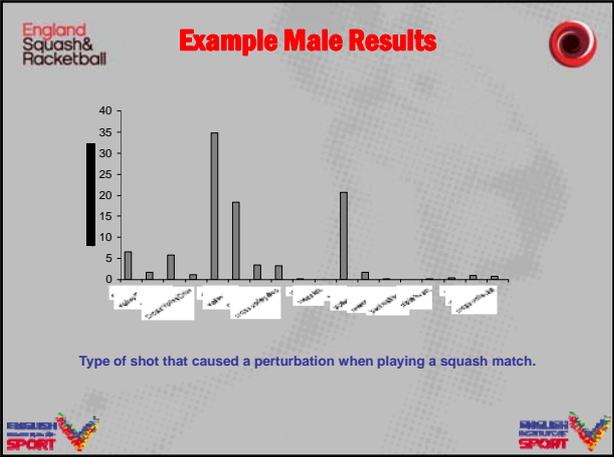
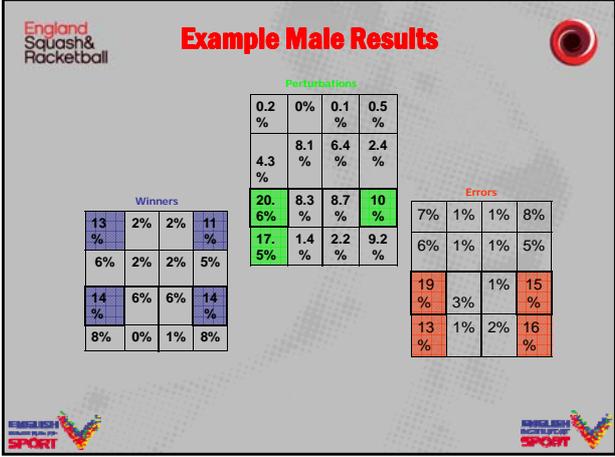
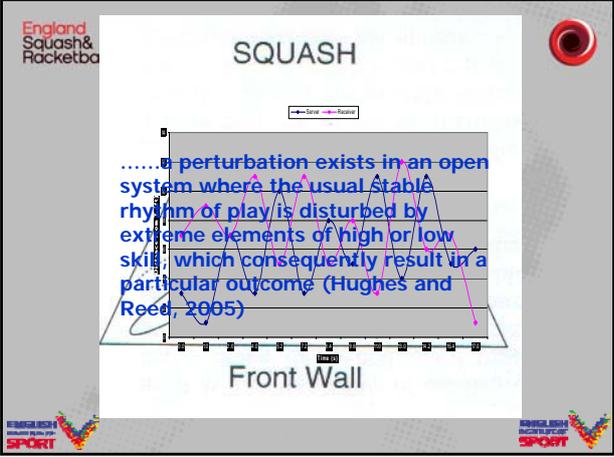
The graph shows 'Cumulative Frequency' on the y-axis (ranging from -4 to 14) and 'Rallies' on the x-axis (ranging from 1 to 29). Two lines are plotted: a blue line for 'Grah. Good' and a pink line for 'Jain. Thicker'. Both lines show an overall upward trend with some fluctuations. Two red circles highlight specific points on the lines.

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### See It Live.....

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### Example 5. Perturbations



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- ### Conclusions
- Scientific – Applied – Sport / Coach led
  - The Athlete should never be a victim of a coaches 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 collectors – Integral to coaching process
  - Making a performance impact
  - Thank you for your attention.....

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**“If it ain't broke, don't fix it”**

Most car mechanics

