“Athlete Career Pathways in Wheelchair Tennis: From Grassroots to Elite Performance”
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1. INTRODUCTION
WHEELCHAIR TENNIS AS ADAPTED SPORT
PLAYERS WITH SPINAL CORD INJURY
PLAYERS WITH TETRAPLEGIA (QUAD)
AMPUTEE PLAYERS

Simple amputee

Double amputee
1976: Wheelchair Tennis started in the USA.
1988: the International Wheelchair Tennis Federation (IWTF) was founded and the ITF adopted the 2 bounce rule in the rules of tennis.
1998 – Wheelchair tennis became fully integrated within the ITF
2007: sanctioned wheelchair tennis events in all 4 Grand Slams.

www.itftennis.com/wheelchair
WHEELCHAIR TENNIS STRUCTURE

- **RULES:**
  - DOUBLE BOUNCE
  - WHEELCHAIR AS BODY
  - WHEEL-FOULT
  - NO FUNCTIONAL CLASSIFICATION

- **COMPETITION**
  - MAIN DRAW
  - SECOND DRAW
  - QUAD

- **UNIQLO WHEELCHAIR TOUR**
  - Prize Money – USD 2m
  - >160 tournaments in 50 countries

- **WTC**
- **PARALYMPICS**
WHEELCHAIR TENNIS TOUR (2015)

- 20 events
- 69 events
- 15 events
- 16 events
- 7 events
- 6 events

www.itftennis.com/wheelchair

www.theodora.com/maps
NOWADAYS WHEELCHAIR TENNIS SITUATION
INTERNATIONAL FEDERATIONS

Ciclismo Pista - Ruta

Curling en Silla

Remo

Tenis en Silla

Tiro con Arco

Piragüismo

Vela

Boccia

Rugby Silla

Baloncesto Silla

Voleibol

Fútbol 7
TENNIS VS. WHEELCHAIR TENNIS
NATIONAL FEDERATION GOAL:
FROM GRASSROOTS TO ELITE PERFORMANCE

- REACH TOP PERFORMANCE
- BUILD A PLAYER
- DETECT PLAYERS
2. ARRIVAL TO TENNIS

CONGENITAL
From 6-9 years

ACQUIRED
From 19-23 years

- Previous practice
- Without experience
3. HOW TO DESIGN A PATHWAY?
3.1. PATHWAY: DEVELOPMENT PLAN WT BASED ON

- FUN
- LEARNING
- DOMAIN OF THE FUNDAMENTALS OF TENNIS
- PLAYING WITH FRIENDS

Lubbers & Gould, 2003
3.1. DEVELOPMENT PLAN WT CHARACTERISTICS

< DURATION OF PHASES
- LATER START

REDUCTION OF SAMPLE
- WOMEN AND JUNIOR
- GOAL ORIENTATION

SIMILAR PROCESSES OF TENNIS
- BALYI AND HAMILTON MODEL
3.1. DEVELOPMENT PLAN WT: STAGES

- **FUNDAMENTAL**: 6-9
- **LEARNING TO TRAIN**: 8-12
- **TRAINING TO TRAIN**: 11-16
- **TRAINING TO WIN**: > 17
- **TRAINING TO COMPETE**: 15-18

(Crespo & Reid 2009)
FUNDAMENTAL PHASE: EXPLORE (6-9)

- TENNIS INTO SCHOOL
  - PHYSICAL EDUCATION TEACHER TRAINING COURSE
- MATERIAL
  - SPORT TENNIS: PLAY & STAY
  - SPORT WHEELCHAIR
- EXPERT
  - COACH WITH EXPERIENCE
  - PLAYER / FORMER PLAYER
- FRECUENCE: 1-2 DAYS PER WEEK
- TENNIS IN REHAB CENTERS
- TENNIS IN CLUBS
LEARNING AND TRAINING TO TRAIN PHASES (9-15):
ENCOURAGE & ENHANCE PHASE

- TENNIS INTO CLUBS AND LOCAL FED (TALENT ID)
- COACHES EDUCATION TRAINING COURSE
- MATERIAL
  - SPORT TENNIS
  - SPORTS WHEELCHAIR
- EXPERT
  - COACH WITH EXPERIENCE
- FRECUENCE: 2/3 TIMES PER WEEK (90MIN)
- TRAINING CAMPS
TRAINING TO COMPETE (15-18): PERFORMANCE

- TENNIS INTO LOCAL AND NATIONAL FED
- EXPERTS COACHES
- SPECIFIC TRAINING
  - 5 DAYS/WEEK (2+1)
- NATIONAL & INTERNATIONAL COMPETITION
  - JUNIOR NATIONAL TEAMS
  - SENIOR NATIONAL TEAMS
- TRAINING CAMPS
- COMBINED WITH STUDIES
TRAINING TO WIN (>18): HIGH PERFORMANCE

- TENNIS INTO LOCAL AND NATIONAL FED
  - EXPERTS COACHES
  - SPECIFIC TRAINING
    - 5-6 DAYS/WEEK (2+1) + 2º
  - NATIONAL & INTERNATIONAL COMPETITION
    - INDIVIDUAL TENNIS TOUR
    - SENIOR NATIONAL TEAMS
  - STUDIES: UNIVERSITY
3.2. PROFESSIONAL INVOLVED

More than 250 tennis coaches specialized

More than 60 coaches per year
3.2.1. COACHES EDUCATION

WORKSHOP
- 30 HOURS

INITIAL EDUCATION
- LEVEL 1
- LEVEL 2
- LEVEL 3
3.3. RESOURCES: FACILITIES

- More than 1500 tennis clubs
- More than 40 private tennis academies
- 19 local tennis federations (16)
- 1 high performance center: CAR
3.3. RESOURCES: EVENTS, MASS MEDIA & SPONSORS

- More than 2 tournaments per month from April till November
- More of 5 International tournaments a year
- More and more scientific articles
- More support from private companies
- Support from professional tennis players
La importancia de no ponerse límites

Jariel Caverzaschi, con 17 años, ya es número 2 del ranking nacional y subcampeón del mundo junior junto al también madrileño Roberto Chamizo.
FULLY INTEGRATED INTO FEDERATIONS
3.4. RESEARCH
3.4.1. RESEARCH

COACH
PLAYER
GAME
3.4. 1. RESEARCH COMPARING TENNIS VS WT
FOCUS ON THE COACH

SYSTEMATIC OBSERVATION VERBAL BEHAVIOUR AND TRAINING TASK

FOCUS ON THE PLAYER: PHYSIOLOGICAL RESPONSES

FOCUS ON THE PLAYER: PHYSIOLOGICAL RESPONSES

Intermitent Sport (1)

120-140 HR
65-75% HRMax (2)

Lac 2 mmol (3)

RPE 12-13 (3)

Anthopometric profile ??

Injury prevention ??

Level of Disability ??

(1) (Kovacs, 2007; Sanz, et al., 2011; Sánchez-Pay et al., 2014)
(2) (Barfield, Malone, & Coleman, 2009; Bernardi et al., 2010; Coutts, 1988; Croft et al., 2010; Roy et al., 2006; Sindall et al., 2013)
(3) (Sanz et al., 2005, 2007; Abel et al., 2008)
## FOCUS ON THE GAME: NOTATIONAL ANALYSIS

<table>
<thead>
<tr>
<th>Autor</th>
<th>Muestra</th>
<th>Partidos</th>
<th>TT (min)</th>
<th>TR</th>
<th>DP (s)</th>
<th>GP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Croft et al. (2010).</td>
<td>6 jugadores catalogados como élite.</td>
<td>Torneo internacional</td>
<td>70.9</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Filipcic &amp; Filipcic (2009).</td>
<td>15 jugadores masculinos (10 sin ranking ITF).</td>
<td>22 partidos simulados en Green Set.</td>
<td>54.13</td>
<td>10.32</td>
<td>4.16±0.60</td>
<td>–</td>
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<tr>
<td>Roy et al. (2006).</td>
<td>6 jugadores masculinos nivel recreativo</td>
<td>6 partidos simulados</td>
<td>70.2±14.4</td>
<td>10.5±1.3</td>
<td>15.15±1.4%</td>
<td>–</td>
</tr>
<tr>
<td>Sindal et al. (2013).</td>
<td>14 jugadores masculinos (n7 ≤25 ITF; y n7 ≥350 ITF)</td>
<td>14 Partidos de competición</td>
<td>52.0±9.1</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Veltmeijer et al. (2014).</td>
<td>3 SCI</td>
<td>Partidos simulados</td>
<td>21.3±7.6</td>
<td>8.4±1.1</td>
<td>3.7±0.8</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td>5 no SCI</td>
<td></td>
<td>25.2±7.5</td>
<td>9.8±2.1</td>
<td>4.0±0.7</td>
<td>–</td>
</tr>
</tbody>
</table>
FOCUS ON THE GAME: NOTATIONAL ANALYSIS

- Match Length: 50-80 m (1)
- Ratio: 1:4 (2)
- Points length: 4-10 secs (3)
- Number of bounces: ??
- Differences between Surfaces: ??
- Male & Female Comparison: ??
- 2-4 strokes per point (4)

(1) (Croft et al., 2010; Filipčič & Filipčič, 2009b; Roy et al., 2006; Sindall et al., 2013)
(2) (Filipčič & Filipčič, 2009b; Roy et al., 2006; Sanz et al., 2009)
(3) (Bullock & Pluim, 2003; Filipčič & Filipčič, 2009b; Veltmeijer et al., 2014)
(4) (Bullock & Pluim, 2003; Filipčič & Filipčič, 2009b; Veltmeijer et al., 2014)


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### Statistical differences in match activity between male and female matches

<table>
<thead>
<tr>
<th></th>
<th>Male</th>
<th>Female</th>
<th>Differences</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M ± SD</td>
<td>M ± SD</td>
<td>P Value</td>
</tr>
<tr>
<td>Total match time</td>
<td>64.65 ± 13.36</td>
<td>77.62 ± 31.67</td>
<td>.833</td>
</tr>
<tr>
<td>Total set time</td>
<td>30.43 ± 8.04</td>
<td>34.50 ± 9.06</td>
<td>.165</td>
</tr>
<tr>
<td>Effective playing time (%)</td>
<td>20.77 ± 3.42</td>
<td>22.32 ± 5.22</td>
<td>.373</td>
</tr>
<tr>
<td>Total resting time (%)</td>
<td>79.23 ± 3.42</td>
<td>77.68 ± 5.22</td>
<td>.373</td>
</tr>
<tr>
<td>W:R ratio</td>
<td>3.95 ± 0.86</td>
<td>3.72 ± 1.11</td>
<td>.373</td>
</tr>
<tr>
<td>Resting time between points</td>
<td>23.98 ± 9.69</td>
<td>25.91 ± 17.96</td>
<td>.065</td>
</tr>
<tr>
<td>Rally duration</td>
<td>5.58 ± 3.65</td>
<td>6.82 ± 4.83</td>
<td>.000</td>
</tr>
<tr>
<td>Points per set</td>
<td>53.53 ± 11.34</td>
<td>58.11 ± 14.83</td>
<td>.467</td>
</tr>
<tr>
<td>Shots per set</td>
<td>157.24 ± 31.07</td>
<td>180.50 ± 77.82</td>
<td>.766</td>
</tr>
<tr>
<td>Shots per rally</td>
<td>2.90 ± 1.71</td>
<td>3.10 ± 2.01</td>
<td>.095</td>
</tr>
<tr>
<td>Bounces per point</td>
<td>2.46 ± 1.85</td>
<td>2.97 ± 2.53</td>
<td>.000</td>
</tr>
<tr>
<td>Frequency of shots</td>
<td>1.90 ± 0.38</td>
<td>2.15 ± 0.41</td>
<td>.000</td>
</tr>
</tbody>
</table>


3.5. RESEARCH APPLIED TO TRAINING SYSTEMS

- FEW DIFFERENCES RELATED ABLE TENNIS
- SPECIFIC TRAINING ABOUT WT MOBILITY
- SPECIFIC TRAINING FOR WT TENNIS STROKES
  - BALL INTO THE BODY
  - BH PRONATED
  - FH IN-OUT
  - ...
- TAKE CARE ABOUT THE OVERLOAD INTERNAL AND EXTERNAL
SPECIFIC MOBILITY TEST & TRAINING DRILLS

- INTERVALIC INTERMITTENT
- START TEST
  - WITHOUT BALL
- HITTING TEST
  - WITH BALL
HIT & TURN TEST ADAPTED FROM ABLE TENIS TO WHEELCHAIR TENNIS

(Sanz, D.; Solís, M. Pérez, J., Gil, A., Fernández, J. 2011)
4. WAY FORWARD

- INCLUSION
  - FROM THE BASED TO THE PERFORMANCE
  - 2015: FULL SCHOLARSHIP IN CAR
- COMPETITION: NATIONAL & INTERNATIONAL
  - NUMBER INCREASING
- NUMBER OF PLAYERS
  - MALE
  - FEMALE AND QUAD
- THE FUTURE
  - MARTÍN DE LA PUENTE
  - ...

...
5. SUMMARY

- Talent ID
- Development
- High Performance
- Coaches Education
- Professional
- Research
- Mass Media & Sponsors
- Tennis Structures Involved Inclusion
“Illusion, success and failure are not three different things, are stages of a project. It is unavoidable to go through all”
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THANKS FOR YOUR ATTENTION