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1 **Are there differences in elite youth soccer player work rate profiles in congested**
2 **versus regular match schedules?**

3
4 Vinicius Zanetti^{1 2}, Christopher Carling³, Marcelo Saldanha Aoki⁴, Paul S Bradley⁵,
5 Alexandre Moreira¹

6
7 ¹Department of Sport, School of Physical Education and Sport, University of Sao Paulo,
8 Sao Paulo, Brazil

9 ²Red Bull Brazil.

10 ³Institute of Coaching and Performance, University of Central Lancashire, Preston, UK.

11 ⁴School of Arts, Sciences and Humanities, University of Sao Paulo, Sao Paulo, Brazil

12 ⁵Research Institute of Sport & Exercise Sciences, Liverpool John Moores University,
13 Liverpool, UK

14

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19

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21 **Contact details for corresponding Author**

22 Alexandre Moreira PhD

23 School of Physical Education and Sport, Department of Sport,
24 University of Sao Paulo

25 Mail address: School of Physical Education and Sport, Av. Prof. Mello Moraes, 65,
26 Cidade Universitária, 05508-030 - São Paulo-SP, Brasil.

27 Telephone/Fax: +55 11 30918789

28 E-mail address: alemoreira@usp.br

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30 Running head: Congested versus regular soccer match schedules

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37 **versus regular match schedules?**

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42

43 **Abstract**

44

45 Official international tournaments in which youth soccer players participate can involve
46 very congested schedules. Yet no information regarding physical and technical match
47 performance during congested versus regular (non-congested) cycles is available. In this
48 study, accelerations, decelerations, mean metabolic power, and technical performance
49 (offensive and defensive variables) were compared across very congested (VCM; 10
50 international matches played over 3 successive days, including 2 days with 2
51 consecutive matches separated by a 4-5 hr interval) and 10 regular (non-congested)
52 match periods (NCM) in elite male Under 15 (U15, n=11) and Under 17 (U17, n=13)
53 soccer players. Players wore a 15-Hz GPS unit with a 100-Hz tri-axial accelerometer.
54 The session-RPE was assessed 30 min post-match. Results showed a higher number of
55 accelerations/min observed in VCM vs NCM (U15; 2.27 ± 0.35 vs 2.12 ± 0.23 ; effect size
56 [ES]=0.49; U17; 2.27 ± 0.41 vs 2.01 ± 0.31 ; ES=0.69). Decelerations/min were higher
57 during VCM (U15; 1.99 ± 0.27 vs 1.84 ± 0.25 ; ES=0.55; and U17; 1.98 ± 0.35 vs
58 1.80 ± 0.27 ; ES=0.56). Mean metabolic power was higher in the VCM (U15; 0.42 ± 0.06
59 vs 0.37 ± 0.02 ; ES=1.08; U17; 0.46 ± 0.03 vs 0.30 ± 0.03 ; ES=1.94). Technical actions/min
60 were higher in the VCM for U17 (ES=1.60 and 1.37, for offensive and defensive
61 performance, respectively); but lower (during VCM) for U15 (ES=3.59 and 0.28, for
62 offensive and defensive performance). U15 reported a higher session-RPE in the VCM
63 (7.9 ± 0.5 AU vs 6.9 ± 0.5 AU). The findings suggest that running activity in these youth
64 players was unaffected overall in tournaments with congested schedules and that the
65 intensity of match-play was actually greater than in regular match schedules.

66

67 Key Words: match congestion, football, analysis, performance, accelerations.

68

69 **Introduction**

70 Congested match schedules frequently occur in elite-standard senior soccer (8, 17).
71 **Research in a professional team** has shown that players were potentially exposed to 3
72 successive matches played within a 4-day period on up to 13 occasions across any one
73 season (9). Official international tournaments in which youth players (Under 15 [U15]
74 and Under 17 [U17]) participate can also involve very congested schedules. Players are
75 potentially exposed to 2 matches per day (e.g. 25x25min; 10min half-time interval) and
76 5 or 6 matches within a 3 day-time period (2, 21).

77 Despite these intensive schedules, analyses of technical and physical
78 performance, with the latter represented by total distance and that covered at a range of
79 running speeds in several matches played successively over a short period, show that
80 performance was generally unaffected in elite-standard senior players (10, 11, 14, 16,
81 23). In elite youth peers, limited yet contrasting information exists on the effects of
82 congested fixture schedules on technical and physical match performance (2, 7, 29, 30).
83 A recurring issue across all studies in youth players is that none directly compared
84 performance in congested versus regular competitive schedules. This is necessary to
85 account for the potential confounding effects of match context when interpreting
86 changes in performance and the impact of short recovery intervals between matches
87 (e.g., variations in match result, time in possession, home/away fixtures).

88 Research has nonetheless shown that the total distance covered and that run at
89 high-speeds remained unchanged match-to-match over a congested competition in U15
90 Brazilian players (2). In contrast, decrements in these variables were reported in youth
91 Australian **players** (29). Interestingly, players in the former investigation reported a
92 progressive decrease in the frequency of acceleration actions performed across matches.
93 The authors suggested that these actions potentially provide a more valid representation

94 of changes in external load over a congested match schedule compared to traditional
95 metrics such as distances covered.

96 These discrepancies across study findings suggest a need for additional research
97 notably regarding the choice of running performance-related variables. Comparisons of
98 changes in the frequency of acceleration and deceleration actions during congested
99 competitive schedules are necessary (8). Similarly, analysis of alterations in metabolic
100 power (MP) would also be pertinent. MP is used to adjust time motion analysis data to
101 account for the additional energy cost of acceleration and deceleration activities (8).
102 Furthermore, there is a need to determine whether match-related fatigue, quantified
103 using decrements in these variables across match halves for example, evolves across
104 intensified competition periods. Finally, to our knowledge, comparisons of acceleration
105 and deceleration actions, MP and technical performance in elite youth players during
106 congested versus regular match schedules have not been conducted. Collectively, these
107 proposals would provide additional evidence on the effects of fixture congestion on
108 match performance in elite youth soccer players' and can help inform training and
109 recovery prescription and player rotation strategies to optimize performance during such
110 schedules.

111 The aim of this study was to compare physical and technical match performance
112 and subjective perceptions of exercise intensity in elite youth male players during very
113 congested versus regular match schedules. It was hypothesized that during the former,
114 lower values for accelerations, decelerations, MP, and technical actions, and a higher
115 perceived intensity would be observed.

116

117

118

119 **Methods**

120 *Experimental approach to the problem*

121 Two elite male youth soccer teams were assessed during international tournaments. The
122 tournaments required each team to play 5 matches over 3 successive days. During these
123 very congested match schedules (VCM), time motion analyses of competitive running
124 activity derived using Global Positioning Systems (GPS), session ratings of perceived
125 exertion (S-RPE) and match analyses of technical performance were collected. Five
126 matches were also played as part of the regular non-congested match schedules (NCM)
127 for each team (U15 and U17). Comparisons between the same performance measures in
128 the very congested versus non-congested schedules were then conducted.

129

130 *Subjects*

131 All participating players belonged to U15 and U17 teams from a single elite
132 soccer club. These teams participate regularly in national and international competitions
133 and have reached top-ranked positions such as the semi-finals of the main National
134 State Championships for their respective age-categories (2016-17). They also were
135 winners of International Tournaments such as Next Generation Trophy (Austria, 2017)
136 for the U15 and Amtzell Cup (Germany, 2017) for the U17 team.

137 Forty-four (20 U15 and 22 U17) elite male Brazilian soccer players, initially
138 volunteered to participate in this study. Only data for players participating in at least 3
139 out of 5 VCM and 3 out of 5 NCM (completion of minimum 75% of total match time in
140 every match) were considered for analysis. Consequently, 24 outfield players, 11 from
141 the U15 (14.9 ± 0.4 yrs; 173.2 ± 7.6 cm; 61.6 ± 8.8 kg; 1.0 ± 0.6 yrs from peak height
142 velocity) and 13 from the U17 (16.6 ± 0.4 yrs; 177.5 ± 6.0 cm; 68.3 ± 6.8 kg; 2.4 ± 0.5
143 yrs from peak height velocity) were included. Despite not maintaining rigid playing

144 positions, as can be expected in U15 and U17 match-play, of the 24 players, position-
145 specific data for 5 full backs, 7 central defenders, 6 midfielders, and 6 forwards were
146 analyzed.

147 All the U15 and U17 players typically participated in 5-8 soccer training
148 sessions per week (strength and conditioning and technical-tactical sessions) and
149 competed in a weekly single match. The U15 and U17 players habitually performed 2
150 strength training sessions in the gym per week. The main differences between teams
151 regarding the strength training sessions was that the U15 habitually participated in a
152 hybrid training session, which consisted of weight training during the first part of the
153 session followed by specific-soccer technical exercises, while the U17 performed the
154 weight training sessions as an isolated session (separated from the technical/tactical
155 training sessions). The specific conditioning training sessions were composed of high-
156 intensity short running bouts (HIB) and small-sided-games (SSG). Usually, players
157 performed HIB or technical exercises prior to SSG.

158 Written informed assent and consent were obtained from each player and their
159 parents or guardians, respectively, and the study was approved by the local University
160 Ethics Committee. All players underwent a thorough medical assessment to verify their
161 health status prior to participation and were free from illness or injury at the time of this
162 study.

163

164 *Procedures*

165 Competitive schedules

166 The team's competitive schedules are presented in Table 1. The U15 male youth
167 team played 5 matches over 3 successive days during an international competition (The
168 Next Generation Trophy, Salzburg, Austria, 2016). Running and technical performance

169 and the session rating of perceived exertion (S-RPE) were assessed in 2 matches played
170 on the 1st day of the competition; in 2 on the 2nd day, and in 1 on the 3rd day (25x25
171 min; 10-min-half-time interval; Table 1). Performance in an U17 male youth team were
172 also assessed over an international competition (Varsseveld Tournament, Varsseveld,
173 Holland, 2016) during which 5 matches were played over 3 successive days. The 1st
174 match was played on the 1st day of the competition, the 2nd and 3rd matches were played
175 on the 2nd day, and the 4th and 5th matches on the 3rd day (25x25 min; 10-min half-time
176 interval) (Table 1). Five matches played as part of regular match schedules (NCM)
177 schedule for each team (U15 and U17) were evaluated to compare performance
178 measures between congested versus non-congested schedules. The assessed matches
179 were from the State Championship of each age-category (35x35 min, with a 10-min
180 half-time interval) and occurred within a 2-month period, during the mid-season.

181 All matches were played on natural grass, and under temperate conditions (mild
182 temperatures). Precise measures of temperature and humidity were not collected. The
183 maximum of 3 substitutions were conducted by coaches in both VCM and NCM
184 matches. No systematic post-match recovery regimen was implemented between the
185 assessed matches during either the VCM or NCM.

186

187 **Table 1 HERE**

188

189 *Physical Performance Parameters*

190 Each player wore a 15-Hz GPS unit coupled with a 100 Hz tri-axial
191 accelerometer (SPI Elite, GPSports, Canberra, Australia). Each unit was harnessed
192 between the shoulder blades and anchored using an undergarment to minimize

193 movement. These provide more valid and reliable measures of total and high-intensity
194 distance compared to 1- and 5-Hz units (20).

195 Physical performance parameters included accelerations and decelerations (>1.8
196 $\text{m}\cdot\text{s}^{-2}$ and $-1.8 \text{ m}\cdot\text{s}^{-2}$, respectively) and average metabolic power (MP) ($\text{W}\cdot\text{kg}^{-1}$)
197 calculations, derived by the manufacturer's software. The threshold adopted for
198 determining accelerations and deceleration actions allowed assessment of light-,
199 moderate-, and high- acceleration and deceleration actions. This threshold has
200 previously been used in youth soccer players to study the effects of congested match
201 schedules (2). MP has been suggested as a reliable marker of locomotor load where
202 acceleration- and velocity-based running are accounted for (coefficient of variation
203 $[\text{CV}\%] = 4.5\%$) (2). All variables were normalized per min of on-field playing time.

204

205 *Technical Performance Parameters*

206 Video recordings were obtained using two digital cameras (Panasonic, 60Hz
207 frequency acquisition). One camera was located 15 m above and to one side of the long
208 axis of the pitch, and the other was placed 5 m to one side of the pitch to facilitate
209 player identification and coding. Dartfish 9 TeamPro software (Dartfish, Fribourg,
210 Switzerland) was used to code match performance.

211 The technical events were chosen to match those used in previous research (21, 27,
212 32). Definitions for variables were:

- 213 • Involvements with the ball: all situations where the player was in contact with
214 the ball.
- 215 • Goal attempts: number of attempts to score a goal.
- 216 • Total passes: number of short and long foot passes performed by a player.
- 217 • Total headers: number of times where a player played the ball with his head.

218 • Tackles and interceptions: number of situations where a player contested the ball
219 with an opponent player irrespective of whether these situations involved or not
220 clear physical contact between players.

221 To examine overall technical performance, two categories were used: offensive and
222 defensive performance. Offensive performance was analysed using data on
223 involvements with the ball, goal attempts, and total passes. Defensive performance was
224 assessed using tackles and interceptions made. Heading actions were also included but
225 not classified according to whether these were attacking or defending actions. This
226 classification was adopted previously in a study on performance in youth players during
227 a congested competitive schedule (21). The offensive and defensive variables were
228 normalized per min of on-field playing time.

229 Results from tests of inter- and intra-reliability of technical performance were found
230 to be excellent when analyzing two trials for each match using two experienced match
231 analysts. The Kappa values for the analysed variables ranged between 0.90–0.95 (inter-
232 observer) to 0.95–0.98 (intra-observer).

233 Due to the playing philosophy of their parent club a 4-4-2 team formation was
234 preferentially adopted during all assessed matches by both the U15 and U17 teams.

235

236 *Match Intensity*

237 To subjectively quantify match intensity, S-RPE was assessed following each
238 match. Each player rated the match intensity using the CR-10 sliding scale 30 min post-
239 match (18). This method is shown to be a valid means for monitoring load in youth
240 soccer players (19, 21).

241

242

243 *Statistical Analysis*

244 Values are presented as means and standard deviations for the ensemble of the
245 matches. A magnitude-based inferential statistical approach was adopted for physical
246 and technical data analyses based on previous recommendations for performance
247 measures (33). Cohen's d effect sizes (ES) were calculated to determine the
248 meaningfulness of the difference, corrected for bias using Hedges formula and
249 presented with 90% Confidence Limits (CL) (3). The differences between match halves
250 within each competition (VCM and NCM), and differences between competitions for
251 the whole match were then examined, for physical and technical parameters, for each
252 age-category, separately. ES with values of 0.2, 0.5, and 0.8 were considered small,
253 medium, and large differences respectively (12). Data were analysed using Microsoft
254 Excel (Microsoft™; USA). A two-way analysis of variance [condition (VCM vs NCM)
255 and time-point assessments (match 1 to match 5)] with repeated measures in the second
256 factor was used for S-RPE, after checking for data normality (Shapiro-Wilk's test) and
257 homoscedasticity (Levene's test). The sphericity of data was assumed according to the
258 Mauchly's test results. In the event of a significant difference, a Bonferroni post-hoc
259 test was used to identify any localized effects. Statistical significance was set at $p < 0.05$.
260 Data were analyzed using Statistica 13.0. (Dell™ Statistica™; EUA)

261

262 **Results**

263 *Physical Performance Parameters*

264 Figure 1 presents data (mean and SD) for accelerations (ACC) (Figure 1A),
265 decelerations (DEC) (Figure 1B), and average metabolic power (MP) (Figure 1C)
266 during the VCM and NCM schedules. In Figure 2 the magnitude of the differences in
267 ACC, DEC, and MP, between the schedules is presented. A difference classified as

268 worthy of consideration ($ES > 0.20$) was observed for the 3 physical performance
269 parameters, in both U15 and U17 players.

270 Figure 3 presents the ES for comparisons in measures across halves (for each
271 match schedule). A decrease in ACC and DEC, from the 1st to the 2nd half was observed
272 in U15 and U17 for both schedules. However, a large increase from the 1st to the 2nd
273 half was observed for MP; with a very large increase for both teams during the NCM. In
274 the VCM, the MP increased (1st to the 2nd half) for U17 but decreased for U15.

275

276 **Figure 1 HERE**

277

278 **Figure 2 HERE**

279

280 **Figure 3 HERE**

281

282 *Technical Performance Parameters*

283 Offensive and defensive values are depicted in Figure 4. In U15, a large
284 difference was observed between the VCM and NCM in relative offensive performance
285 ($ES = 3.59$), with lower values in the VCM. In contrast, the U17's offensive performance
286 was higher during the VCM vs NCM ($ES = 1.60$). The same pattern was observed for
287 defensive performance, with a small difference ($ES = 0.28$) for U15 (lower value during
288 the VCM) and a large difference ($ES = 1.37$) for U17 (higher value during the VCM)
289 respectively. Regarding the change in technical performance from the 1st to the 2nd half,
290 an increase in offensive performance was observed for U15 and U17 during the NCM
291 ($ES = 0.91$ and 0.32 , respectively); with a small change during the VCM for U15 only
292 ($ES = 0.20$). The U15 demonstrated a large increase in defensive performance during the

293 **NCM** (ES=0.92), while no change was noted for U17 (ES=0.00). During the VCM,
294 however, no change was observed for U15 (ES=0.00) or U17 (ES=0.07).

295

296 **Figure 4 HERE**

297

298 *Perceived Match Intensity (session-RPE)*

299 No interactions (condition [schedules] vs time [matches]) ($F=0.50$; $p=0.73$) or
300 time ($F=0.93$; $p=0.44$) effects were observed for U15. In contrast, there was a condition
301 effect ($F=7.50$; $p=0.001$), with higher match intensity observed for the VCM. No effect
302 of interaction ($F=2.24$; $p=0.95$), time ($F=1.07$; $p=0.39$), or condition ($F=0.98$; $p=0.35$)
303 was observed for match intensity in U17. Figure 5 presents the match intensity
304 descriptive values for conditions (schedules) in U15 and U17.

305 **Figure 5 HERE**

306

307 **Discussion**

308 This study compared physical and technical match performance and perceived
309 intensity during very congested versus regular match schedules in elite youth male
310 players. Contrary to the hypothesis, higher values for physical performance parameters
311 were observed in the VCM for U15 and U17 teams. In both teams, analysis of ACC and
312 DEC showed a decrease from the 1st to the 2nd half in both match schedules. In contrast,
313 MP values for the **NCM** increased in the 2nd compared to the 1st half, in both teams. The
314 U17 performed a higher number of offensive and defensive actions in the VCM versus
315 **NCM**. In U15, however, a lower number of offensive technical actions was observed in
316 the VCM. There was a large increase in offensive performance from the 1st to the 2nd
317 half for U15 and U17 in the **NCM** whereas a lower increase occurred during the VCM.

318 The U15 demonstrated a large increase in defensive performance (1st vs 2nd half) during
319 the NCM, but not in the VCM. A greater perceived match intensity (higher S-RPE) was
320 observed for the VCM in the U15 but not the U17.

321 The higher relative values observed for ACC, DEC and MP in the VCM show
322 that players elevated their running output (per minute) when participating in this
323 intensive tournament format. Based on the present results and considering data from the
324 literature (1, 13, 15, 20, 25, 28), it is reasonable to assume that the intensity of the match
325 play was higher during the VCM. This is an important finding as it shows that youth
326 players were able to cope physically during these intensive schedules. A reasonable
327 explanation for the higher work intensity observed in the VCM might be the players'
328 knowledge of the reduced duration of the match. The players' response to match
329 demands during a congested schedule could be associated with a self-regulation or
330 pacing strategy, consciously or subconsciously, of physical effort (5, 10, 21). As
331 numerous factors can influence pacing strategies (31), including the knowledge of
332 exercise end-point and bout duration, it can be speculated that players worked harder
333 during the VCM compared to the NCM due to their knowledge about the shorter
334 duration of the match.

335 The possible influence of the quality of the opponent on these findings on
336 running performance should also be highlighted and cannot be ruled out as a possible
337 contextual factor that potentially impacted performance (14). Indeed, the higher
338 intensity in VCM might be also associated with an elevated players competitiveness
339 (and perhaps higher motivation), due to playing against higher-level (international)
340 opponents.

341 A decrease in the ACC and DEC from the 1st to the 2nd half was observed in both
342 schedules in U15 and U17. However, during the NCM, MP values increased in the 2nd

343 half. Taking into account the direct role of velocity in setting instantaneous metabolic
344 power (24), the increase in 2nd half MP during the NCM, suggests that players
345 performed a higher number of other high-intensity (speed) actions in the 2nd half (e.g.
346 straight runs); but were unable to do this in the VCM.

347 The present results regarding S-RPE corroborate an early study in youth players
348 reporting a range of S-RPE values between 7.1 ± 1.2 AU (arbitrary units) to 8.2 ± 0.7
349 AU for the 7 matches played during a national VCM schedule (21). Here, the mean S-
350 RPE value during the VCM was 7.92 AU (0.51) for the U15 and 8.01 AU (1.31) for the
351 U17, respectively. It is noteworthy that the evaluated matches were played in a high-
352 perceived intensity zone (> 7 AU). The results for S-RPE also indicate that the U15
353 perceived the VCM as more intense than NCM. Again, this finding may be linked to the
354 higher standard of the opponents played against in this competition although no
355 difference between the competitions was observed for U17. The results for S-RPE
356 might also be associated with findings for the analysis of physical and technical actions.
357 The lower number of offensive and defensive actions observed for the U15 during the
358 VCM vs NCM might be due to an elevated perceived exertion in the VCM, which in
359 turn was induced by the higher external work load performed by these players during
360 the VCM. Working harder and perceiving a higher exertion might lead the players to try
361 to reduce their involvement in the match to preserve energy.

362 As pointed out by Boksem and Tops (4) individuals can try to minimize the
363 energetic costs of performance by adopting behavioral strategies that require minimal
364 levels of effort. Reducing the involvement (lower number of performed technical
365 actions) in the match might be a behavioral strategy to attempt to reduce perceived
366 exertion to preserve energy. The match outcomes cannot be ruled out as a factor
367 influencing the higher S-RPE values in U15 during the VCM; this team won 1 of 5

368 played matches, while during the NCM, the U15 won 4 of 5 played matches. The effect
369 of match outcome during different types of match schedules in similar populations
370 merits investigation in future studies.

371 While the current investigation adds novel evidence to the literature, some
372 limitations should be acknowledged. As two teams from the same club were assessed,
373 caution is required in making inferences regarding the results which might be associated
374 to personal game philosophy and the tactical strategies adopted by the coaches. Other
375 contextual factors (e.g different opponent standards, winning, defeating or drawing at a
376 given moment of the match, motivation in the competitions) might also have influenced
377 the results. The use of more than one ACC and DEC threshold might provide a clearer
378 picture of differences in physical performance between conditions (VCM vs NCM
379 match). It is also important to highlight that the present findings are representative of a
380 very unique congested match schedule for elite male youth players. Thus, the results
381 should not be generalized to elite senior players while may also not be appropriate for
382 application to populations with a potentially lower level of skill and competitiveness.

383 Additionally, the implications of using MP should be considered. Buchheit et al.
384 (6), for example, questioned the MP value for monitoring purposes in soccer. The
385 authors argue that locomotor-derived MP largely underestimates the actual net
386 metabolic demands. On the other hand, Osgnach et al. (24) question the use of a direct
387 comparison of actual VO₂ and MP to validate MP. Even recognizing the importance of
388 the arguments for adopting or not adopting the MP for monitoring physical performance
389 in soccer, it should be highlighted that consideration is necessary concerning MP
390 validity within the limits of the current discussion.

391 In conclusion, these findings suggest that the present youth players' work rate
392 profiles were not impaired in VCM and that the relative physical intensity of match-play

393 was increased in this type of competition. Moreover, the present results suggest a
394 decrease in the physical intensity of the match-play from the 1st to the 2nd half in both
395 schedules, except for MP during the NCM; and contrasting results were observed across
396 the teams for technical action and session-RPE.

397

398 **Practical Applications**

399

400 The higher intensity of play in the VCM reported here suggests there is a need
401 for preparation strategies to provide players with opportunities to experience playing at
402 greater intensities than usual during training sessions. For instance, players could
403 participate in small-sided-games (SSG) designed to elicit high intensity play (through
404 manipulation of rules, number of players, area per player, etc). Monitoring using GPS
405 devices would ensure real-time adjustments in exercise intensity. Programming and
406 monitoring performance in matches to mimic the very congested schedule could also be
407 relevant to aid preparation for this type of competition. For example, players could
408 perform two simulated matches in a day (i.e. morning and afternoon) over two
409 successive days while receiving real-time feedback from coaches to increase and
410 maintain high intensity play. These approaches would be useful to prepare players
411 physically and mentally to the demands of this type of schedules, and the efforts
412 required as well as being an opportunity to test pacing strategies during the competition.

413

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518 **Figures legends**

519

520 Figure 1. Data normalized per minute of on-field playing time (mean \pm SD) for
521 accelerations (ACC [A]), decelerations (DEC [B]), and average metabolic power (MP
522 [C]) for the VCM (very congested) and **NCM** (regular) match schedules (U15 and U17).

523

524 Figure 2. The magnitude of the differences in accelerations (ACC), decelerations
525 (DEC), and average metabolic power (MP), between the VCM (very congested) and
526 **NCM** (regular) match schedules. The positive scores denote higher values in the VCM
527 compared to the **NCM**. Grey bar denotes an effect size (ES) $>$ 0.20.

528

529 Figure 3. The magnitude of the differences in accelerations (ACC), decelerations
530 (DEC), and average metabolic power (MP) between halves for the VCM (very
531 congested) and **NCM** (regular) match schedules. Grey bar denotes an effect size (ES) $>$
532 0.20.

533

534 Figure 4. Offensive and defensive performance during **NCM** (regular) and VCM (very
535 congested) match schedules (whole matches [total matches; TM] and 1st and 2nd halves;
536 data normalized per minute of on-field time) (mean \pm SD).

537

538 Figure 5. Match intensity (S-RPE; mean \pm SD) for the VCM (very congested) and **NCM**
539 (regular) match schedules in U15 and U17. *significant difference from **NCM**.

540

541

Table 1. Competition schedules and results

UNDER-15						
VCM				NCM		
M	Opponent	Result	Day of the competition; time of the beginning of the match	*M	Opponent	Result
1 st	Weder Bremem	0 – 0 (draw)	1 st ; morning; 11:00	1 st	Guarani	3 – 0 (won)
2 nd	Manchester City	1 – 1 (draw)	2 nd ; afternoon; 16:00	2 nd	Bragantino	5 – 1 (won)
3 rd	Valencia	0 – 1 (lost)	3 rd ; morning; 9:00	3 rd	Paulista	2 – 1 (won)
4 th	Sagan Tosu	2 – 1 (won)	4 th ; afternoon; 14:00	4 th	AD Guarulhos	0 – 2 (lost)
5 th	Red Bull Salzburg	1 – 2 (lost)	5 th ; morning; 10:00	5 th	Juventus	4 – 1 (won)
UNDER-17						
1 st	Grafshap	1 – 0 (won)	1 st ; afternoon; 17:30	1 st	Guarani	3 – 1 (won)
2 nd	Utrech	0 – 0 (draw)	2 nd ; morning; 12:00	2 nd	Bragantino	2 – 1 (won)
3 rd	Sporting	2 – 0 (won)	3 rd ; afternoon; 16:00	3 rd	Paulista	1 – 0 (won)
4 th	Mechelen	0 – 0 (draw)	4 th ; morning; 12:00	4 th	AD Guarulhos	3 – 1 (won)
5 th	AZ Alkima	0 – 1 (lost)	5 th ; afternoon; 16:00	5 th	Juventus	4 – 1 (won)

543 VCM = very congested match schedule; NCM = regular match schedule; M = match;

544 *all NCM were played on mornings; U15 matches beginning at 9:00 and U17 matches

545 beginning at 11:00; Results (assessed team match outcome).

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