



Monitoring practices of training load and biological maturity in UK soccer academies

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1 **Appendix 1: Survey Questions**

2

3 Section 1: Eligibility Questions

- 4 1. Have you already completed this survey? (Yes or No; No to
5 qualify)
6 2. Are you currently working with athletes in an EPPP or RTC
7 setting?
8 a. EPPP
9 b. RTC
10 c. No – disqualified from completing form

11 Section 2: General Information

- 12 3. Which professional league is your employer's senior squad
13 competing in?
14 a. Premier League
15 b. Championship
16 c. League 1
17 d. League 2
18 e. National League
19 f. National League North/South
20 4. What is your club's current EPPP or RTC rating?
21 a. Category/Tier 1
22 b. Category/Tier 2
23 c. Category/Tier 3
24 d. Category/Tier 4
25 5. What is your specific role within the club?
26 a. Academy Manager
27 b. Head of Sport Science and Medicine
28 c. Lead Coach
29 d. Age Group Coach
30 e. Strength and Conditioning Coach
31 f. Rehabilitation Coach
32 g. Sport Science support
33 h. Physiotherapist/Sports Therapist
34 i. Doctor
35 j. Other
36 6. What type of employment is this position?
37 a. Full-time
38 b. Part-time
39 c. Hourly/Sessional
40 d. Internship
41 e. Student – work experience
42 f. Consultancy
43 7. Which phase of the EPPP or RTC are you primarily
44 responsible for?
45 a. Foundation (8 - 12 years)
46 b. Youth Development Phase (13 – 16 years)
47 c. Professional Development Phase (> 16 years)

48
49 Section 3: Biological Maturity Monitoring

50 Q1. Does your club actively monitor player maturation status?

- 51 a. Yes
52 b. No (If no, please outline brief reasons why)

53 Q2) Using the sliders below, please indicate your perceived level of
54 importance (0 = not important – 100 = highly important) of the
55 measurement of maturation status with the YDP age groups

- 56 a) For the overall player development
 57 b) Load management
 58 c) Injury prevention
 59 d) Bio-banding training sessions
 60 e) Bio-banding matches/competitions
 61 f) Player recruitment
 62 g) Player retention
 63 h) Forecasting
 64 i) EPPP Legislation
 65 j) Club Legislation
 66 k) Player feedback
 67 l) Coach feedback
 68 m) Reports to parents
- 69 Q3. What approach do you primarily adopt to monitor timing and
 70 tempo of maturation status?
- 71 a. Prediction of Adult Height
 72 i. Khamis-Roche
 73 ii. Beunen-Malina
 74 iii. Cumulative Height Velocity Curves
 75 b. Maturation Offset
 76 i. Mirwald et al. Maturity Offset
 77 ii. Moore et al. Redeveloped Maturity Offset
 78 iii. Other
 79 c. Skeletal Maturity
 80 i. Fels
 81 ii. Tanner-Whitehouse
 82 iii. Greulich-Pyle
 83 iv. Other
 84 d. Other; Please outline:
 85
- 86 Q4. Who is primarily responsible for this?
 87 a. Academy Manager
 88 b. Lead Coach
 89 c. Age group coaches
 90 d. Medical staff – Doctor/Physiotherapist/Sports
 91 Therapist
 92 e. Sport Science staff – Sport Scientist/Strength and
 93 Conditioning Coach/Nutritionist
 94 f. Intern/Student
- 95 Q5. Who is the information from these assessments reported to?
 96 a. Academy Manager
 97 b. Lead Coach
 98 c. Age group coaches
 99 d. Medical staff – Doctor/Physiotherapist/Sports
 100 Therapist
 101 e. Sport Science staff – Sport Scientist/Strength and
 102 Conditioning Coach/Nutritionist
 103 f. Players
 104 g. Parent/guardian
 105 h. Senior Management
- 106 Q6. What primary method is adopted for this feedback?
 107 a. Verbal communication via meeting
 108 b. Written report
 109 c. Infographic
 110 d. Visual representation – Chart/Graph/Excel/Power BI

- 111 e. Other
- 112 Q7. If using maturation status to group players for training and/or
- 113 matches, which type of activity is this for? Tick all that apply
- 114 a. Pitch-based sessions
- 115 b. Gym based sessions
- 116 c. Recovery sessions
- 117 d. Competitive fixtures (Formal games programme)
- 118 e. Ad-hoc arranged fixtures
- 119 f. Specifically arranged tournaments
- 120 g. Other:
- 121 Q8. What barriers have you faced when looking to implement the
- 122 measurement of maturation status?
- 123 a. Financial budget limitations
- 124 b. Staffing numbers
- 125 c. Staffing competency
- 126 d. Resource limitations
- 127 e. Management support
- 128 f. Coach support
- 129 g. Time constraints
- 130 h. None of the above
- 131 i. Suitable training on equipment and/or methods
- 132 j. Other:
- 133

134 Section 4: Training Load Monitoring

- 135 Q1. Do you currently employ a system to monitor training loads for
- 136 Youth Development Phase (12-16-year-old) players?
- 137 a. Yes
- 138 b. No
- 139 Q2) Using the sliders below, please indicate your perceived level of
- 140 importance (0 = not important – 100 = highly important) for
- 141 monitoring training load with YDP age groups
- 142 a) For overall player development
- 143 b) Non-contact injury prevention
- 144 c) Systematic progression of training through age
- 145 groups
- 146 d) Prescription of future training activities
- 147 e) Individualisation of training activities
- 148 f) Player recruitment
- 149 g) Player retention
- 150 h) Forecasting
- 151 i) EPPP legislation
- 152 j) Club legislation
- 153 k) Player feedback
- 154 l) Coach feedback
- 155 m) Parent feedback
- 156 n) Internal load monitoring
- 157 o) External load monitoring
- 158 Q3. What is your primary approach to monitoring training within the
- 159 Youth Development Phase?
- 160 a. GPS based
- 161 b. Subjective perceived exertion (RPE) based
- 162 c. Physiological (HR, iTRIMP etc) based
- 163 d. Coach perception
- 164 e. Science and Medical staff perception
- 165 f. Wellness scoring

- 166 g. Individual player verbal feedback
167 h. Other
- 168 Q4. How is your training load data compiled and interpreted?
169 a. PMA
170 b. Customised excel workbook
171 c. Monitoring software/app
172 d. Other
- 173 Q5. Who is primarily responsible for the collation of training load
174 monitoring?
175 a. Academy Manager
176 b. Lead Coach
177 c. Age group coaches
178 d. Medical staff
179 e. Sport Science staff
180 f. Intern/Student
181 g. Players
- 182 Q6. How frequently are load reports produced?
183 a. Daily
184 b. Weekly
185 c. Fortnightly
186 d. Monthly
187 e. Three Monthly
188 f. Six-monthly
189 g. Annually
- 190 Q7. Who is this training load data reported to?
191 a. Academy Manager
192 b. Lead Coach
193 c. Age group coaches
194 d. Medical staff
195 e. Sport Science staff
196 f. Players
197 g. Parent/guardian
198 h. Senior Management
- 199 Q8. What barriers have you faced when looking to implement
200 training load monitoring systems?
201 a. Financial budget limitations
202 b. Staffing numbers
203 c. Staffing competency
204 d. Resource limitations
205 e. Management support
206 f. Coach support/compliance
207 g. Limited opportunity for intervention
208 h. Suitable training on equipment and/or methods
209 i. None of the above
210 j. Other:

1 **Monitoring practices of training load and**
2 **biological maturity in UK soccer academies**

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29 **Abstract**

30 ***Purpose***

31 Overuse injury risk increases during periods of accelerated
32 growth which can subsequently impact development in academy
33 soccer, suggesting a need to quantify training exposure. Non-
34 prescriptive development scheme legislation could lead to
35 inconsistent approaches to monitoring maturity and training
36 load. Therefore, this study aims to communicate current
37 practices of UK soccer academies towards biological maturity
38 and training load.

39 ***Methods***

40 Forty-nine respondents completed an online survey
41 representing support staff from male Premier League academies
42 ($n = 38$) and female Regional Talent Clubs ($n = 11$). The survey
43 included 16 questions covering maturity and training load
44 monitoring. Questions were multiple-choice or unipolar scaled
45 (agreement 0-100) with a magnitude-based decision approach
46 used for interpretation.

47 ***Results***

48 Injury prevention was deemed *highest* importance for maturity
49 (83.0 ± 5.3 , mean \pm SD) and training load monitoring ($80.0 \pm$
50 2.8). There were *large* differences in methods adopted for
51 maturity estimation and *moderate* differences for training load
52 monitoring between academies. Predictions of maturity were
53 deemed *comparatively low* in importance for bio-banded

54 (biological classification) training (61.0 ± 3.3) and *low* for bio-
55 banded competition (56.0 ± 1.8) across academies. Few
56 respondents reported maturity (42%) and training load (16%) to
57 parent/guardians, and only 9% of medical staff were routinely
58 provided this data.

59 ***Conclusions***

60 Although consistencies between academies exist, disparities in
61 monitoring approaches are likely reflective of environment-
62 specific resource and logistical constraints. Designating
63 consistent and qualified responsibility to staff will help promote
64 fidelity, feedback and transparency to advise stakeholders of
65 maturity-load relationships. Practitioners should consider
66 biological categorisation to manage load prescription to promote
67 maturity appropriate dose-responses and help reduce non-
68 contact injury risk.

69
70 **Keywords:** *maturation, training load, monitoring, injury,*
71 *adolescence, soccer*

72

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77

78 Introduction

79 For academy soccer players, the pubertal growth period is a
80 particularly sensitive time and should be managed with
81 caution^{1,2}. This period coincides with progressive, age specific
82 increases in prescribed training exposure (hours), irrespective of
83 individual biological maturation based on the development
84 scheme legislation (policy)^{3,4}. Elite Player Performance Pathway
85 (EPPP)³ and FA Women's Talent Pathway for Regional Talent
86 Clubs (RTC)⁴ policy provides recommendations for
87 multifaceted components of player development, including
88 minimum weekly training time, staff requirements, monitoring
89 training load and biological maturity. The systematic increases
90 in training exposure across both genders predominantly reflect
91 development stage informed increases in weekly training load
92 (20-50% depending on academy category) with adolescent
93 players⁵. Most injuries within adolescent soccer are non-contact
94 and soft tissue in nature^{6,7} suggesting that these injuries may be
95 attributable to inadequate training load prescription or growth-
96 related physical and anthropometrical changes^{8,9}. Significant
97 time loss through injury, or illness may have major implications
98 for (de)selection and long-term development¹⁰.

99

100 Most (58-69%) injuries within professional soccer academies
101 occur during training rather than match-play. Injuries peak

102 following periods of relatively increased (relative risk of 3.5
103 following pre-season) or reduced training exposure (mid-season
104 break)^{6,11,12}. These findings are consistent with adult
105 populations, where large (>10%) and sudden fluctuations in
106 training load can amplify injury risk¹⁵. This highlights the
107 importance of quantifying training load to mitigate injury risk¹⁴,
108 particularly during periods of accelerated biological
109 development¹. Consequently, to enhance long-term development
110 and improve the sensitivity of (de)selection criteria, fluctuations
111 in physical and functional attributes of players owing to
112 maturity, and the associated response to training exposure,
113 should be monitored and communicated to key stakeholders (e.g.
114 coaches, medical staff and parents/guardians)¹⁵.

115
116 EPPP and RTC policies aim to outline minimum standards for
117 each category to facilitate adequate talent development
118 environments for players. Adherence to these standards are
119 assessed and used to classify each academy (e.g., category 1/tier
120 1) in return for financial investment and associated prestige
121 helping with recruitment and retention. ~~However~~Yet, the extent
122 of EPPP guidelines is somewhat non-prescriptive and open to
123 interpretation (e.g. ‘188.2. anthropometric assessments’ and
124 ‘188.7. monitoring of physical exertion [Category 1 academies
125 only]’³), with no minimum expected monitoring standards or
126 guidelines provided in RTC legislation⁴. Although this

127 ambiguity facilitates context and environment specific
128 approaches which are warranted¹⁶, it may subconsciously reduce
129 consistency and generate opportunity for '*mixed-practice*' rather
130 than '*best-practice*'.

131

132 Various methods to predict maturity status and timing exist with
133 each having logistical, systematic or resource-based confines¹⁷.
134 Similar limitations exist for training load monitoring which
135 influences the methods adopted by academies¹⁶. As a result,
136 debate remains around approaches to monitoring training load
137 and which combination of internal (e.g. heart rate, rating of
138 perceived exertion [RPE]) or externally derived metrics (e.g.
139 total distance covered, activity profiles) offer most value for
140 academy practitioners¹⁶.

141

142 Previous surveys investigating training load monitoring have
143 been conducted within professional populations^{18,19} and
144 identified varied approaches to collating and disseminating data
145 to stakeholders, with resource and communication-based
146 limitations apparent. Despite strong evidence outlining its
147 relevance within academy settings, no such attempt to
148 investigate current practices of maturity and training load
149 monitoring within male or female academy soccer currently
150 exists. Assessing the current extent of, and manner in which both
151 male and female academies monitor these factors, would provide

152 a platform to develop practice and subsequently optimise
153 development. Therefore, given likely disparities in situational,
154 logistical and environmental factors that govern both male and
155 female academy practices, the aim of the current study was to
156 establish and compare current perceptions and perceived barriers
157 of practitioners to maturity and training load monitoring within
158 UK soccer academies.

159

160 **Methods**

161 *Design*

162 A cross-sectional survey design was used to ascertain
163 perceptions of staff from male (EPPP) and female (RTC)
164 academies during the first trimester (August to December) of the
165 2017/18 soccer season. Following ethical approval from the
166 University ethics committee and in accordance with the
167 Declaration of Helsinki, voluntary informed consent was
168 included prior to survey completion. No personal details of the
169 respondent or club were requested to maintain respondent
170 anonymity. Two eligibility questions 1) *Have you already*
171 *completed the survey?* (Yes or No); 2) *Are you currently working*
172 *with academy players within an EPPP or RTC setting?* (EPPP,
173 RTC or No) followed the consent page to prevent duplicate
174 responses and ensure construct validity respectively. Each
175 respondent was required to state which professional league their
176 club competed in, the academy category (e.g. Cat/RTC), job role,

177 employment status accompanied by which age category
178 (Foundation [<9 to <12 years], Youth Development [<13 to <16
179 years], Professional Development [<18 to <23 years]) they
180 primarily worked with.

181

182 ***Subjects***

183 118 respondents started the survey, however, there were 23
184 incomplete responses and 46 respondents failed eligibility
185 criteria (question 2) and were excluded from analysis. In total,
186 49 respondents completed the survey (Cat1: $n = 15$ [31%]; Cat2:
187 $n = 13$ [27%]; Cat3: $n = 10$ [20%]; RTC: $n = 11$ [22%]). Most
188 respondents worked in the Youth Development Phase (YDP;
189 57%) or Professional Development Phase (PDP; 39%); with 4%
190 working with the Foundation Phase (FP). Most responses were
191 from sport science support staff (sport scientists, strength and
192 conditioning coaches, athletic development or physical
193 development coaches; 77%) with medical (physiotherapists,
194 sports therapists, rehabilitation specialist or doctor; 15%) and
195 technical coaching staff (lead or age group coach; 8%) providing
196 the remainder of the responses. Most of the respondents were
197 employed either full-time (57%) or part-time (23%), with a
198 smaller number of responses coming from sessional staff (hourly
199 paid; 14%) and internship students (6%). Most respondents
200 worked for Championship (43%) or Premier League (29%)

201 clubs, but some responses were from League One (14%), League
202 2 (6%) and clubs within the National League or below (8%).

203

204 ***Methodology***

205 Content validity²⁰ of the initial survey was reviewed via
206 communications between the research team and practitioners (n
207 = 5) and academics ($n = 4$) with experience of academy soccer
208 and survey-based studies. This process removed five questions,
209 combined six questions into three and had language amendments
210 for clarity. The final survey consisted of 16 questions that
211 included 2 unipolar (0 = *not important*, 100 = *highly important*)
212 and 6 multiple choice questions each, covering two concepts: 1)
213 *monitoring of biological maturity* and 2) *training load*
214 *monitoring*. Response analysis to establish internal consistency
215 of each concept using Cronbach's alpha²¹ yielded alphas rated as
216 'good', which ranged from 0.78 [95% confidence interval 0.72
217 to 0.86] (*monitoring of biological maturity*) to 0.83 [0.72 to 0.86]
218 (*training load monitoring*). The survey was then published using
219 an online survey tool (surveymonkey.com, California, Palo Alto,
220 USA), with completion time of ~10 minutes. A web-link invite
221 to participate was distributed to coaches, sport science support
222 staff and medical practitioners within EPPP and RTC clubs via
223 personal networks and social media.

224

225 ***Statistical Analysis***

226 Responses from the multiple-choice questions were converted
227 into a proportion of the total number of respondents from each
228 academy category. Independent-group proportion differences
229 for multiple choice questions were calculated with the following
230 scale used to classify magnitudes of difference 10%, 30%, 50%,
231 70% and 90% as *small*, *moderate*, *large*, *very large* and
232 *extremely large* respectively²². Given the small sample size and
233 the large number of inferences, we elected to use moderate as
234 our threshold for meaningful differences.

235
236 Numerical data from unipolar-scaled questions were rank
237 ordered and presented as mean \pm SD to qualitatively illustrate
238 perceived importance. To facilitate distribution-based
239 interpretations and overcome the limitations of few verbal
240 anchors on the unipolar scale, four perception levels were
241 devised based on percentage thresholds of the overall mean;
242 *lowest (<25%), comparatively low (25% to 50%), comparatively*
243 *high (50% to 75%) and highest (>75%)²³*. Inferential analysis
244 (ANOVA) was conducted using JASP computer software
245 (v0.11.1, Amsterdam, Netherlands) to establish independent
246 group mean differences in perceived importance and 99%
247 compatibility limits (CL) to reduce inferential error rates~~limits~~
248 ~~(CL) to reduce false error rates~~, which were subsequently
249 translated into probabilistic terms using a customised
250 Magnitude-Based Decisions (MBD) spreadsheet²⁴. A clear

251 standardised difference for non-clinical substantiveness of
252 ~~0.610%~~ was adopted, as this is considered the ~~moderate-smallest~~
253 ~~important effect~~ threshold for between-group differences²². ~~Only~~
254 ~~those effects that were above the smallest important effect were~~
255 ~~reported and these~~~~This was-were~~ then ~~used-interpreted~~ against
256 the following Bayesian scale: 0.5% *most unlikely* or *almost*
257 *certainly not*; 0.5-5% *very unlikely*; 5-25% *unlikely* or *possibly*
258 *not*; 25-75% *possibly*; 75-95% *likely* or *probably*; 95-99% *very*
259 *likely*; and 99.5% *most likely*²⁴ to express uncertainty. ~~A clear~~
260 ~~outcome is considered one where the 99% CL is not considered~~
261 ~~substantial for both positive and negative~~. For both approaches
262 to analysis, all comparisons were made against EPPP Cat1
263 academies. In light of the EPPP infrastructure being more mature
264 than RTC, and these Cat1 academies fulfilling significant
265 requirements to be awarded this status, they should be regarded
266 as the benchmark of best practice within UK academy football.

267

268 **Results**

269 *****Table 1 near here*****

270

271 ***Biological Maturity***

272 Injury prevention was identified as *highest* importance for
273 estimation of maturity across academy groups, with overall
274 athletic development, load management, coach and player
275 feedback considered *comparatively high* (Table 1). Legislative

276 expectations from clubs and governing bodies as well as bio-
277 banded competition were considered *lowest* importance. Cat1
278 academies placed more importance on EPPP legislation than
279 Cat3 academies and a *likely* to *very likely* lower importance on
280 player feedback than all other academies. Time constraints, staff
281 numbers, resource limitations and staff competency were all
282 perceived to be *comparatively higher* barriers to implementing
283 maturity predictions (Table 1). Staff numbers and resource
284 limitations are *likely* to *very likely* bigger barriers in lower ranked
285 academies than Cat1. Coach support, financial budget
286 limitations, management and parental/guardian support were all
287 perceived as *comparatively low* barriers, with differences
288 between Cat1, Cat3 and RTC academies *possible* to *likely*.

289

290 *****Table 2 near here*****

291

292 There were *large* differences between the methods of maturity
293 estimation utilised by Cat1 and Cat2 academies (Table 2). Cat1,
294 3 and RTC academies preferred the prediction adult height whilst
295 Cat2 had a clear preference for maturity offset (i.e. time from
296 peak height velocity). Sport Science support staff were primarily
297 responsible for collection of maturity data consistently across all
298 academies. There were no small to large differences in the
299 methods used by academies to communicate maturity feedback and
300 *moderate* to *very large* differences suggesting that fewer Cat1

301 academies report this data to parents/guardians. There were
302 small to moderate differences that suggests that academy status
303 is linked to the activities influenced by maturity status
304 monitoring (i.e. pitch-based training, competitive fixtures etc).

305

306 *****Table 3 near here*****

307

308 ***Training Load***

309 Monitoring training load is deemed *highest* importance for injury
310 prevention (Table 3). Player recruitment, retention,
311 parent/guardian and player feedback and legislative purposes
312 were considered *comparatively low* importance. Responses
313 suggest Cat 1 academies *likely* share load monitoring
314 information with parent/guardians less often than other
315 academies.

316

317 Resource limitations, staffing numbers, financial budget
318 limitations and limited intervention opportunity were all
319 considered *comparatively high* barriers to training load
320 monitoring (Table 3). Cat3 academies *likely* find these barriers
321 more prominent than Cat1. Management and coach support, staff
322 competency and limited opportunity for intervention were
323 *comparatively low* barriers to training load monitoring. A
324 *possible to likely* differences in coach support may infer greater
325 coach buy-in within Cat1 academies than others. Additionally, it

326 is *likely* that RTC academies perceived staff competency as a
327 greater barrier than Cat1 academies.

328

329 *Moderate* differences suggest that Cat1 academies utilise RPE
330 and coach perception less than other academies in preference for
331 external training load measures (Table 4). *Small to moderate*
332 differences suggest that Cat1 academies favour customised
333 spreadsheets to the Performance Management Application
334 (PMA), however conversely it is worth noting that the PMA is
335 not available for RTC academies which likely influenced
336 between-group comparisons. Training load data was mostly
337 collated by Sport Science support staff with *moderate*
338 differences between Cat1 and RTC academies. *Moderate*
339 differences suggest Cat1 academies report training load data to
340 age group coaches more frequently than other academies, but
341 less to lead age group coaches than Cat2 academies.

342

343 *****Table 4 near here*****

344

345 **Discussion**

346 This study represents the first attempt to establish perceptions of
347 monitoring of maturity and training load in UK soccer academies.
348 Given inherent differences between the two constructs, findings
349 are discussed individually.

350 ***Biological Maturity***

351 Practitioners agreed that injury prevention was of *highest*
352 importance for predicting maturity characteristics. Responses
353 indicate that practitioners recognise associations between
354 maturity characteristics and amplified injury risk, and that
355 monitoring maturity positively influences long-term outcomes¹.
356 ~~However~~Yet, there is disparity concerning protocols employed
357 to predict maturity between academies, with indicators of timing
358 (offset) and status (percentage of predicted adult height)
359 prominent. ‘*Other*’ responses may include a maturity ratio,
360 growth velocity curves or skeletally derived methods (e.g. body
361 dimensions)²⁵. Both dominant protocols are advocated by the
362 legislative bodies, however Cat1, Cat3 and RTC academies
363 demonstrated a greater reliance on the prediction of adult height,
364 with C2 favouring maturity offset (Table 2). Their prevalence is
365 likely attributable to the ‘non-invasive’ and logistically simple
366 algorithm-based protocols, yet evidence has previously outlined
367 limitations in somatic assessment of maturity in comparison with
368 more invasive skeletal protocols¹⁷. Consequently, it is
369 imperative that practitioners are cognisant of the relevant
370 methodological limitations and accommodate for this when
371 informing decision making to ensure appropriate classification
372 and accurate (de)selection evaluations.

373 Despite being pivotal for categorisation, practitioners
374 unanimously perceived maturity prediction of *comparatively*
375 *low* importance for biologically classified training and *lowest* for
376 competitions. This is perhaps surprising given the recent rise of
377 bio-banded male soccer tournaments supported by the EPPP, in
378 which players are categorised by their current biological
379 maturity²⁶. The relative immaturity of the Women's FA Talent
380 Pathway could explain the *comparatively low* importance placed
381 on this by RTC clubs. Bio-banding is largely considered “an
382 alternative method of categorising players, according to maturity
383 status rather than their chronological age category, with the
384 assumption that this will alleviate (de)selection bias associated
385 with earlier and/or later maturing players.”²⁷

386 Bio-banding is a relatively new concept that has until recently
387 traditionally adopted a talent development and selection focus,
388 and therefore the relevance of bio-banding for managing load
389 and injury was possibly overlooked within survey responses. It
390 is reasonable to think that biological constraints within training
391 and match-play would reduce physical variation and help
392 coaches adequately stimulate players to reduce the typically
393 increased injury incidence around biological growth spurts^{2,26}.
394 Evidence suggests trends in injury type throughout maturation,
395 with late maturers having more osteochondral disorders and
396 earlier maturers having more tendinopathies¹¹. These non-
397 traumatic injuries are largely preventable, which supports that

398 biologically appropriate training prescription may help reduce
399 the incidence of certain injuries through more effective
400 manipulation of intensity. Therefore, practitioners are
401 encouraged to consider the wider benefits of biological
402 categorisation to optimise training load to facilitate biologically
403 relevant content¹.

404 Time constraints, resource limitations, staff number and
405 competency were considered as *comparatively high* barriers
406 particularly in lower ranked academies, which could negatively
407 impact validity of maturity predictions,²⁸. Even when maturity
408 assessments are stringently controlled, prediction equations can
409 vary 0.1 to 0.2 years between weekly measures²⁹. Therefore,
410 anthropometric data collection requires precise measurements to
411 reduce systematic error, which may be compromised in the
412 absence of adequately trained or experienced staff, equipment or
413 time. Whether these data are sport science led as
414 predominant prevalent within the survey, or medical staff led,
415 consistency is paramount to reduce systematic error and thus
416 safeguard data fidelity (i.e. inter-rater reliability)²⁵. Importantly,
417 the quality of internal communication between support, medical
418 and technical staff within soccer clubs has been linked with
419 injury rates and match availability¹⁵. Therefore, academies that
420 designate responsibility of maturity monitoring to specifically
421 trained staff will likely enhance transfer to positively influence

422 athletic performance and associated caveats (i.e. reduction of
423 injury risk).

424 There were *moderate* to *very large* differences between the low
425 number of Cat1 respondents reporting maturity data to players
426 and parent/guardians. This is surprising considering Cat1
427 academies perceive resources as comparatively lower barriers
428 than Cat3 and RTC and therefore likely have better mechanisms
429 to communicate this information effectively. Being transparent
430 with maturity data and informing parent/guardians of the
431 associated transient physical and functional turbulence related to
432 growth, disadvantages (i.e. stress or anxiety) may be alleviated
433 and may even lead to an autonomy supportive bio-psychosocial
434 environment, reducing the likelihood of drop-out or injury³⁰. In
435 contrast, failure to involve stakeholders or providing a clear
436 rationale for decision-making has been termed as '*autonomy-*
437 *thwarting*' behaviour and linked to failed career progression and
438 behavioural disengagement within soccer³¹.

439

440 ***Training Load monitoring***

441 Injury prevention perceived to be of *highest* importance for
442 monitoring training load within academies. This is likely
443 influenced by recent associations between training exposure and
444 injury in both adult and adolescent populations^{32,33}. Despite

445 being of *highest* importance for injury prevention, remarkably
446 almost no medical staff were routinely provided training load
447 data (Table 4). This may suggest a reactive approach to injury
448 management, opposed to a proactive approach whereby medical
449 staff are actively involved in load management decisions. By
450 routinely sharing training load data with medical staff (e.g.
451 multidisciplinary team meetings), a more unified approach could
452 better inform the process and help reduce injury incidence¹⁵.
453 This suggests a communication breakdown in lower ranked
454 academies, negating the purpose of monitoring training load and
455 possibly the impact on reducing injury burden¹⁵.

456 In addition, responses suggest coach and player feedback,
457 overall development, systematic progression and
458 individualisation and prescription of future training activities
459 were considered of *comparatively high* importance. Although
460 Cat1 academies reported training load to coaches 80% of the
461 time, other academies reported this data to coaches less. On a
462 positive note, this implies that active engagement in training load
463 monitoring is accepted across academies, but the communication,
464 interpretation and application of this appears to be negating
465 impact, likely attributable to the resources available. Although
466 these findings outline reduced impact of monitoring strategies,
467 they correspond with similar conclusions from professional
468 soccer^{18,19}. These studies identified coach buy-in and discipline
469 as prominent barriers to the effective impact of training load

470 monitoring, implying that this problem is not an academy-
471 isolated problem. In resolution, academies are encouraged to
472 employ a routine load monitoring strategy enabling consistent
473 collation and interpretation of data in line with context specific
474 and resource appropriate objectives that fit their structure¹⁶. This
475 should be combined with an education programme to involve all
476 stakeholders and subsequently establish palatable dissemination
477 strategies to enhance its application¹⁶, potentially supported by a
478 local academic institution.

479 Cat1 academies utilise external training loads more than other
480 academies, which is unsurprising based on the resource
481 investment associated with this. This potentially explains why
482 other academies (Cat3) perceive staff numbers, financial budgets
483 and resource limitations, as *comparatively high* barriers to
484 training load monitoring. Although microelectromechanical
485 systems (MEMS) may provide a wealth of data, it does not
486 automatically result in better monitoring outcomes as some
487 ambiguity exists around the precision of devices and metrics to
488 monitor³³. Research suggests combining internal and external
489 loads offer best practice and better dose-response outcomes¹⁶ to
490 appropriately quantify the magnitude of internal response in light
491 of the external stimulus³². This is crucial during periods of
492 accelerated growth, considering likely fluctuations of the dose-
493 response within adolescent soccer.

494 In the absence of resources to facilitate MEMS, RPE has been
495 shown to be a suitable and valid surrogate gauge of relative
496 psychophysical training intensity³⁴. The application of RPE
497 derived training load values are accessible and cost-effective,
498 which may explain the dominant use of this within academies
499 that reported financial and resource barriers (Cat2, Cat3 & RTC).
500 RPE correlates well with physiological and some MEMS derived
501 metrics, and they can be collated retrospectively with suitable
502 validity in adolescent populations, although an approach
503 utilising multiple markers of training load is preferable if
504 resources permit^{14,34}.

505 *Limitations*

506 Although 49 responses are comparative to other soccer surveys
507 ($n = 19-41$ ^{18,29,35}), it is below that of others ($n = 182-242$ ¹⁹). It is
508 acknowledged responses from the study represent a portion of
509 the population and the opportunity for multiple responses from
510 academies could lead to clustering¹⁹. ~~However,~~ The smaller
511 sample size is somewhat negated as responses were from high-
512 performance environments from a finite pool of UK-based
513 academies. From anecdotal estimations, this study includes
514 responses from approximately 38% of registered academies,
515 from which a statistically conservative approach to inference
516 was adopted to minimise false positive risk with power and
517 precision results indicated by the 99% compatibility intervals for

518 ~~moderate~~—smallest important effects only. It is also
519 acknowledged that engagement in this survey is more likely
520 from those academies actively engaged in load and maturity
521 monitoring, which may have influenced findings.

522 Finally, it is noted differences between the more established
523 EPPP and developing FA Women's Talent Pathway academies
524 exist, and that legislations for these pathways may influence
525 differences in responses. However, this survey provides the first
526 comparison between the professional practices of male and
527 female adolescent academies and was therefore considered a
528 novel facet to the study.

529

530 **Practical Applications**

531 Designating consistent responsibility for data collation to
532 suitably qualified staff may enhance maturity and training load
533 data dependability, engagement and help establish palatable
534 dissemination strategies. Through this more effective feedback
535 loop, academies will promote transparency of data and better
536 inform stakeholders of maturity-load relationships leading to
537 enhanced impact at group and individual levels. This
538 interdisciplinary approach will require a more proactive, and
539 targeted style of monitoring, to facilitate early intervention
540 around accelerated growth periods. Finally, practitioners should

541 consider using biological categorisation to help manage load
542 prescription and maturity appropriate dose-response to help
543 reduce non-contact injury risk.

544 **Conclusion**

545 Survey responses suggest that routine monitoring of biological
546 maturity and training load is commonplace within adolescent
547 soccer and that clubs adopt monitoring practices to primarily
548 prevent injury. ~~However~~But, resource and environmental
549 constraints create natural diversity around the methodologies
550 and success of the monitoring process which may nullify impact.
551 Without positively impacting player development or reducing
552 injury risk, the monitoring process is futile. Therefore,
553 practitioners are encouraged to identify a context-specific
554 monitoring system that can be reliably and consistently applied
555 and communicated to players, coaches and parent/guardians
556 efficiently.

557

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561

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563

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Table 1: Perceived importance (mean \pm SD) of biological maturity estimations between clubs sorted by percentiles (sample mean \pm SD), with chances that the true magnitude of difference is important. Effects below the smallest important threshold are not reported. All comparisons made against Category 1 academies (Cat1).

	Cat1 (n = 15)	Cat2 (n = 13)	Cat3 (n = 10)	RTC (n = 11)	Mean (n = 49)	Between-group differences and <i>probability</i> of important differences Mean difference \pm 99% CL
<i>Perceived level of importance of the estimations of biological maturity for....</i>						
^H injury prevention	79 \pm 13	84 \pm 19	79 \pm 11	91 \pm 10	83 \pm 14	<i>Possibly</i> , RTC 11%; \pm 11%
^{CH} overall player development	74 \pm 15	87 \pm 14	80 \pm 12	80 \pm 12	80 \pm 14	<i>Possibly</i> , Cat3 6%; \pm 15%
^{CH} load management	79 \pm 10	79 \pm 20	75 \pm 12	80 \pm 21	78 \pm 16	
^{CH} coach feedback	75 \pm 11	80 \pm 12	72 \pm 9	76 \pm 10	76 \pm 11	
^{CH} player feedback	58 \pm 18	73 \pm 19	72 \pm 14	81 \pm 14	71 \pm 19	<i>Likely</i> , Cat2 15%; \pm 17%; Cat3 14%; \pm 18%; <i>Very Likely</i> , 23%; \pm 19%
^{CL} player retention	72 \pm 13	78 \pm 22	64 \pm 22	59 \pm 19	68 \pm 19	<i>Possibly</i> , Cat3 -8%; \pm 21%; RTC -13%; \pm 20%
^{CL} reports to parents	64 \pm 13	75 \pm 22	56 \pm 22	75 \pm 19	68 \pm 17	<i>Possibly</i> , Cat2 11%; \pm 16%; Cat3 -8%; \pm 17%; RTC 11%; \pm 16%
^{CL} player recruitment	71 \pm 16	71 \pm 22	67 \pm 17	58 \pm 24	67 \pm 20	<i>Possibly</i> , RTC -14%; \pm 21%
^{CL} bio-banded training	59 \pm 27	64 \pm 23	57 \pm 21	63 \pm 22	61 \pm 23	
^L club legislation	54 \pm 17	60 \pm 25	51 \pm 26	64 \pm 15	58 \pm 21	
^L bio-banded competition	53 \pm 28	57 \pm 32	55 \pm 23	57 \pm 21	56 \pm 26	
^L EPPP/RTC legislation	59 \pm 15	50 \pm 28	39 \pm 25	52 \pm 26	50 \pm 23	<i>Likely</i> , Cat3 -20%; \pm 23%
<i>What are the primary barriers to implementing estimations of biological maturity?</i>						
^{CH} time constraints	57 \pm 23	65 \pm 33	73 \pm 28	66 \pm 26	65 \pm 27	<i>Possibly</i> , Cat3 16%; \pm 29%
^{CH} staffing numbers	47 \pm 27	42 \pm 35	76 \pm 33	47 \pm 32	53 \pm 33	<i>Likely</i> , Cat3 29%; \pm 34%
^{CH} resource limitations	30 \pm 19	31 \pm 26	59 \pm 29	45 \pm 33	41 \pm 28	<i>Possibly</i> , RTC 15%; \pm 28%; <i>Very Likely</i> , Cat3 29%; \pm 29%
^{CH} staffing competency	41 \pm 26	37 \pm 28	32 \pm 26	53 \pm 32	41 \pm 28	<i>Possibly</i> , RTC 12%; \pm 29%
^{CL} coach support	37 \pm 26	38 \pm 35	42 \pm 27	31 \pm 23	37 \pm 28	
^{CL} financial budget limitations	25 \pm 24	30 \pm 31	53 \pm 37	35 \pm 27	36 \pm 31	<i>Possibly</i> , Cat2 5%; \pm 30%; RTC 10%; \pm 32%; <i>Likely</i> , Cat3 28%; \pm 33%
^{CL} management support	36 \pm 28	36 \pm 32	35 \pm 26	26 \pm 21	33 \pm 27	<i>Possibly</i> , RTC -10%; \pm 29%
^{CL} Parent/guardian support	17 \pm 16	26 \pm 32	27 \pm 22	29 \pm 30	25 \pm 25	<i>Possibly</i> , Cat3 10%; \pm 28%; RTC 12%; \pm 27%

Perceived importance: 0 = not important, 100 = highly important; Perception level: ^L lowest; ^{CL} comparatively low; ^{CH} comparatively high; ^H highest

Probability of important differences: <0.5%, most unlikely; 0.5-5%, very unlikely; 5-25%, unlikely; 25-50%, possibly; 75-95%, likely; 95-99.5%, very likely; >99.5% most likely (Hopkins, 2019)

Cat1, Category 1 academy; Cat2, Category 2 academy, Cat3, Category 3 academy; RTC, Regional Talent Club.

Table 2: Number of responses (percentages) and qualitative differences magnitude for questions relating to biological maturation estimations. All comparisons made against Category 1 academies (Cat1) with only magnitudes of *Small* or greater reported.

Question and Responses	Cat1 (n = 15)	Cat2 (n = 13)	Cat3 (n = 10)	RTC (n = 11)	Proportion Difference Magnitude
<i>Which approach is primarily adopted for estimating biological maturity?</i>					
Prediction of adult height	9 (60)	1 (8)	6 (60)	5 (46)	<i>Small: RTC; Large: Cat2</i>
Maturity offset	5 (33)	12 (92)	3 (30)	3 (27)	<i>Large: Cat2</i>
Skeletal maturity	0 (0)	0 (0)	0 (0)	2 (18)	<i>Small: RTC</i>
Other	1 (7)	0 (0)	1 (10)	1 (9)	
<i>Who is primarily responsible for collecting biological maturation data?</i>					
Medical staff	1 (7)	2 (15)	0 (0)	3 (28)	<i>Small: RTC</i>
Sport Science support staff	14 (93)	11 (85)	8 (80)	8 (72)	<i>Small: Cat3; RTC</i>
Other	0 (0)	0 (0)	2 (20)	0 (0)	<i>Small: Cat3</i>
<i>*Who is biological maturity data reported to?</i>					
Academy manager	10 (67)	8 (62)	7 (70)	6 (55)	
Lead age group coach	12 (80)	12 (92)	8 (80)	9 (82)	<i>Small: Cat2</i>
Age group coaches	14 (93)	10 (77)	7 (70)	9 (82)	<i>Small: Cat2, Cat3, RTC</i>
Medical staff	15 (100)	11 (85)	9 (90)	9 (82)	<i>Small: Cat2, Cat3, RTC</i>
Sport Science support staff	14 (93)	12 (92)	9 (90)	9 (82)	<i>Small: RTC</i>
Intern/student	2 (13)	6 (46)	2 (20)	2 (18)	<i>Large: Cat2</i>
Player	7 (47)	5 (39)	5 (50)	7 (64)	<i>Small: RTC</i>
Parent/guardian	1 (7)	5 (39)	4 (40)	9 (82)	<i>Moderate: Cat2, Cat3; Very large: RTC</i>
<i>What is the primary method of feedback on biological maturation estimations?</i>					
Infographic	1 (7)	0 (0)	0 (0)	0 (0)	
Verbal communication	1 (7)	2 (15)	1 (10)	8 (73)	<i>Large: RTC</i>
Visual presentation	9 (60)	8 (62)	6 (60)	2 (18)	<i>Moderate: RTC</i>
Written report	4 (27)	3 (23)	3 (30)	1 (9)	<i>Small: RTC</i>
<i>*When using biological maturity to group players, what activities is this for?</i>					
Pitch-based sessions	8 (25)	8 (29)	4 (25)	2 (25)	<i>Small: Cat3; Moderate: RTC</i>
Gym-based sessions	7 (22)	8 (29)	4 (25)	4 (50)	<i>Small: Cat2, RTC</i>
Recovery sessions	0 (0)	0 (0)	0 (0)	1 (12.5)	
Competitive fixtures	5 (16)	2 (7)	1 (6)	0 (0)	<i>Small: Cat2, Cat3; Moderate: RTC</i>
Ad-hoc fixtures	7 (22)	6 (21)	3 (19)	1 (12.5)	<i>Small: Cat3; Moderate: RTC</i>
Specific fixtures	5 (16)	4 (14)	4 (25)	0 (0)	

*Question permitted multiple responses

Scale of magnitudes: <10%, trivial; 10-30%, small; 30-50%, moderate; 50-70%, large, 70-90%, very large; >90%, huge²²

Cat1, Category 1 academy; Cat2, Category 2 academy, Cat3, Category 3 academy; RTC, Regional Talent Club.

Table 3: Perceived importance (mean \pm SD) of training load monitoring between clubs sorted by percentiles (sample mean \pm SD), with chances that the true magnitude of difference is important. Effects below the smallest important threshold are not reported. All comparisons made against Category 1 academies (Cat1).

	Cat1 (n = 15)	Cat2 (n = 13)	Cat3 (n = 10)	RTC (n = 11)	Mean (n = 49)	Between-group differences and <i>probability</i> of important differences Mean difference \pm 99% CL
<i>Perceived level of importance for monitoring training load for...</i>						
^H injury prevention	80 \pm 17	80 \pm 24	77 \pm 16	84 \pm 19	80 \pm 19	
^{CH} coach feedback	80 \pm 10	72 \pm 26	74 \pm 7	66 \pm 21	73 \pm 19	<i>Possibly</i> , RTC -14%; \pm 19%
^{CH} prescription of training	72 \pm 18	70 \pm 17	61 \pm 23	80 \pm 9	71 \pm 19	<i>Possibly</i> , Cat3 -11%; \pm 20%
^{CH} individualisation of training	71 \pm 18	65 \pm 21	71 \pm 10	77 \pm 13	71 \pm 17	
^{CH} overall player development	75 \pm 18	65 \pm 25	73 \pm 12	68 \pm 20	70 \pm 20	<i>Possibly</i> , Cat2 -10%; \pm 20%
^{CH} systematic progression	66 \pm 22	68 \pm 15	68 \pm 15	63 \pm 21	66 \pm 21	
^{CH} player feedback	62 \pm 21	52 \pm 26	69 \pm 10	72 \pm 7	64 \pm 20	<i>Possibly</i> , Cat2 -10%; \pm 19%
^{CL} EPPP/RTC legislation	57 \pm 22	44 \pm 26	53 \pm 13	47 \pm 28	50 \pm 24	<i>Likely</i> , Cat2 -13%; \pm 24%
^{CL} player retention	45 \pm 26	44 \pm 25	57 \pm 24	48 \pm 25	49 \pm 25	<i>Possibly</i> , Cat3 12%; \pm 28%
^{CL} Parent/guardian feedback	32 \pm 18	47 \pm 31	51 \pm 15	56 \pm 21	47 \pm 24	<i>Likely</i> , Cat2 15%; \pm 23%; Cat3 19%; \pm 25%; RTC 24%; \pm 24%
^{CL} club legislation	48 \pm 19	39 \pm 21	50 \pm 13	45 \pm 27	46 \pm 21	
^{CL} player recruitment	45 \pm 26	27 \pm 23	44 \pm 25	40 \pm 28	39 \pm 26	<i>Possibly</i> , Cat2 -18%; \pm 26%
<i>What are the primary barriers to implementing training load monitoring?</i>						
^{CH} resource limitations	54 \pm 34	64 \pm 29	84 \pm 24	80 \pm 9	71 \pm 32	<i>Possibly</i> , Cat2 10%; \pm 31%; <i>Likely</i> , Cat3 30%; \pm 34%
^{CH} staffing numbers	59 \pm 28	69 \pm 28	80 \pm 26	63 \pm 29	67 \pm 28	<i>Possibly</i> , Cat2 10%; \pm 28%; <i>Likely</i> , Cat3 21%; \pm 31%
^{CH} financial budget limitations	57 \pm 31	72 \pm 29	82 \pm 18	50 \pm 31	65 \pm 30	<i>Possibly</i> , Cat2 15%; \pm 29%; <i>Likely</i> , Cat3 25%; \pm 31%
^{CL} limited opportunity for intervention	48 \pm 26	69 \pm 33	63 \pm 28	53 \pm 28	58 \pm 29	<i>Possibly</i> , Cat3 15% \pm 32%; <i>Likely</i> , Cat2 2%; \pm 29%
^{CL} staffing competency	38 \pm 28	43 \pm 27	44 \pm 24	55 \pm 32	45 \pm 28	<i>Likely</i> , RTC 17%; \pm 30%
^{CL} coach support	31 \pm 20	51 \pm 38	37 \pm 24	42 \pm 26	40 \pm 28	<i>Possibly</i> , Cat3 6%; \pm 30%; RTC 11%; \pm 30%; <i>Likely</i> , 20%; \pm 28%
^{CL} management support	43 \pm 28	39 \pm 38	34 \pm 25	30 \pm 22	36 \pm 29	<i>Possibly</i> , Cat3 9%; \pm 32%; RTC 13%; \pm 32%

Perceived importance: 0 = not important, 100 = highly important; Perception level: ^L lowest; ^{CL} comparatively low; ^{CH} comparatively high; ^H highest

Probability of important differences: <0.5%, most unlikely; 0.5-5%, very unlikely; 5-25%, unlikely; 25-50%, possibly; 75-95%, likely; 95-99.5%, very likely; >99.5% most likely (Hopkins, 2019)

Cat1, Category 1 academy; Cat2, Category 2 academy, Cat3, Category 3 academy; RTC, Regional Talent Club

Table 4: Number of responses (percentages) and qualitative differences magnitude for questions relating to training load monitoring. All comparisons made against Category 1 academies (Cat1) with only magnitudes of *Small* or greater reported.

Question and Responses	Cat1 (n = 15)	Cat2 (n = 13)	Cat3 (n = 10)	RTC (n = 11)	Proportion Difference Magnitudes
<i>What is the primary approach to training load monitoring?</i>					
GPS devices	7 (47)	4 (31)	0 (0)	0 (0)	<i>Small: Cat2; Moderate: Cat3, RTC</i>
Rating of Perceived Exertion	6 (40)	3 (23)	7 (70)	8 (73)	<i>Small: Cat2; Moderate: Cat3, RTC</i>
Physiological (TRIMP)	1 (7)	0 (0)	0 (0)	0 (0)	
Coach perceptions	1 (7)	4 (31)	2 (20)	1 (9)	<i>Small: Cat2, RTC</i>
Support staff perceptions	0 (0)	0 (0)	1 (10)	0 (0)	<i>Small: Cat3</i>
Wellness data	0 (0)	0 (0)	0 (0)	2 (18)	<i>Small: RTC</i>
Verbal discussion	0 (0)	2 (15)	0 (0)	0 (0)	<i>Small: Cat2</i>
<i>How is your training load data compiled?</i>					
Player Management Application	4 (27)	4 (31)	5 (50)	0 (0)	<i>Small: Cat2, RTC</i>
Customised spreadsheet	9 (60)	8 (62)	3 (30)	9 (82)	<i>Small: RTC ; Moderate: Cat3</i>
Monitoring application	1 (7)	0 (0)	0 (0)	1 (9)	
Other	1 (7)	1 (8)	2 (20)	1 (9)	<i>Small: Cat3</i>
<i>Who is primarily responsible for collating training load data?</i>					
Academy manager	0 (0)	0 (0)	1 (10)	0 (0)	<i>Small: Cat3</i>
Lead age group coach	0 (0)	1 (7)	1 (10)	1 (9)	<i>Small: Cat3</i>
Age group coaches	0 (0)	1 (7)	0 (0)	1 (9)	
Medical staff	0 (0)	1 (7)	1 (10)	2 (18)	<i>Small: Cat3, RTC</i>
Sport Sciences support staff	14 (93)	9 (69)	7 (70)	6 (55)	<i>Small: Cat2, Cat3; Moderate: RTC</i>
Intern/student	1 (7)	1 (7)	0 (0)	1 (9)	
Players	0 (0)	0 (0)	0 (0)	0 (0)	
<i>Who is training load data reported to?</i>					
Academy manager	0 (0)	0 (0)	2 (20)	3 (27)	<i>Small: Cat3, RTC</i>
Lead age group coach	4 (27)	8 (62)	2 (20)	0 (0)	<i>Small: RTC; Moderate: Cat2</i>
Age group coach	8 (53)	1 (8)	2 (20)	4 (36)	<i>Small: RTC; Moderate: Cat2, Cat3</i>
Medical Staff	0 (0)	0 (0)	0 (0)	1 (9)	
Sport Science support staff	1 (7)	2 (15)	1 (10)	0 (0)	
Player	1 (7)	1 (8)	0 (0)	1 (9)	
Other	1 (7)	1 (8)	3 (30)	2 (18)	<i>Small: Cat3, RTC</i>
<i>How frequently are training load reports compiled?</i>					
Daily	9 (60)	6 (46)	2 (20)	2 (18)	<i>Small: Cat2; Moderate: Cat3, RTC</i>
Weekly	5 (33)	2 (15)	2 (20)	5 (46)	<i>Small: Cat2, Cat3, RTC</i>
Monthly	0 (0)	1 (8)	1 (10)	1 (9)	<i>Small: Cat3</i>
Quarterly	0 (0)	0 (0)	0 (0)	2 (18)	<i>Small: RTC</i>
Bi-annually	0 (0)	0 (0)	1 (10)	0 (0)	
Annually	1 (7)	0 (0)	1 (10)	0 (0)	
Other	0 (0)	4 (31)	3 (30)	1 (9)	<i>Moderate:Cat2</i>

*Question permitted multiple responses

Scale of magnitudes: <10%, trivial; 10-30%, small; 30-50%, moderate; 50-70%, large, 70-90%, very large; >90%, huge²²

Cat1, Category 1 academy; Cat2, Category 2 academy, Cat3, Category 3 academy; RTC, Regional Talent Club.