Club Brugge NXT

Maximizing player potential through the growth spurt

29-03-2022

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MISSION

- WIN & DEVELOP PLAYERS

    Strategy
    - ✓ Qualitative training sessions
    - ✓ Objectify
    - ✓ Individualize

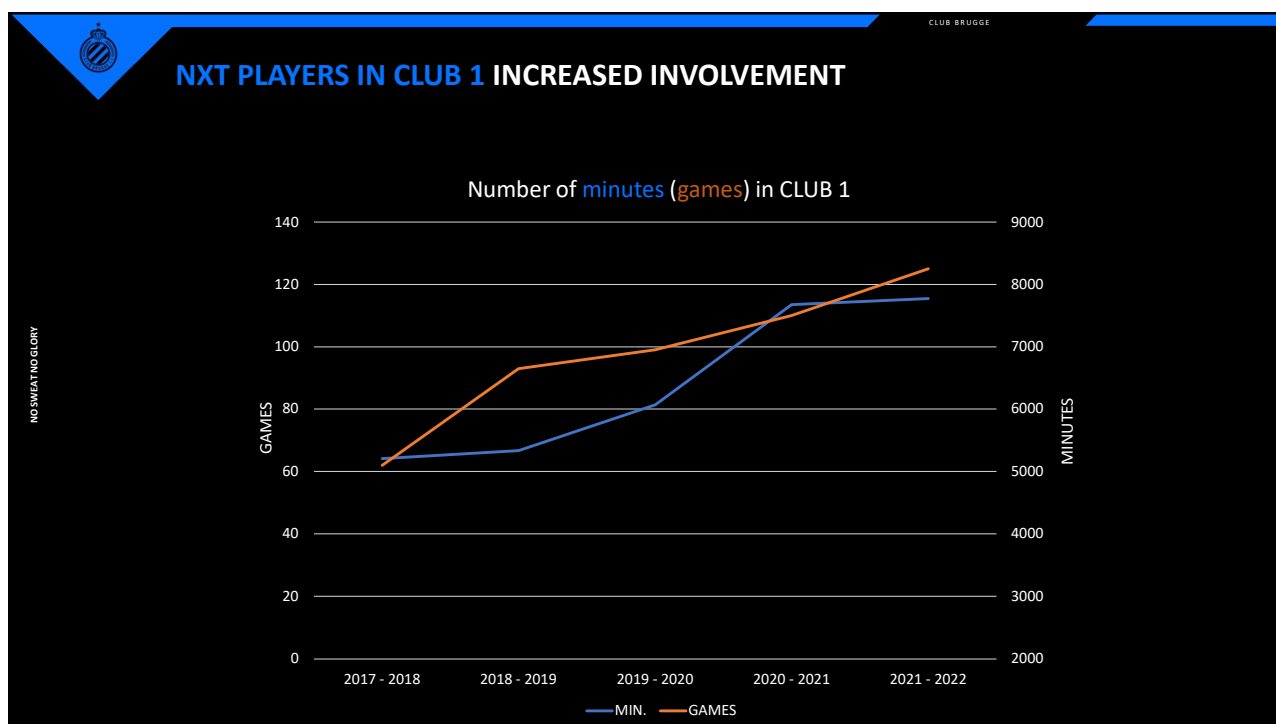→ WIN DOMESTIC LEAGUE + CUP WITH NXT PLAYERS

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CLUBLAB HOLISTIC APPROACH

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NO SWEAT NO GLORY

- Physical
- Medical
- Nutrition
- Mental
- Performance analysis
- Recruitment

→ Risk ↓ and success ↑ in decision-making

→ Injury prevalention ↓ and player availability ↑

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NXT PLAYERS IN CLUB 1 INCREASED INVOLVEMENT

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NO SWEAT NO GLORY

Number of minutes (games) in CLUB 1

GAMES

MINUTES

— MIN. — GAMES

4

THE SEARCH FOR TALENTS

IMPOSSIBLE ???

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GEOGRAPHICAL POSITION

50km>: 6 teams

100km>: 11 teams

SEA BORDER

ANTWERP

BRUSSELS

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INDIVIDUAL DEVELOPMENT IN EVERY SEGMENT OF FOOTBALL
>>> TEAM PERFORMANCE

HIGH PERFORMANCE INFRASTRUCTURE

COACHING EXPERTISE

INDIVIDUAL LOAD MANAGEMENT

INTERNATIONAL GAMES

VIDEO ANALYSIS

MENTAL COACH

DEVELOPMENT COACH

LIFESTYLE (NUTRITION, GROUND RULES,…)

TAILORMADE SCHOOL (94% OF SUCCESS)
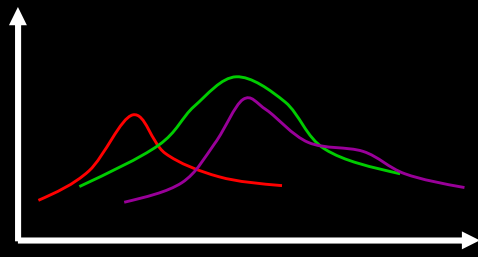
TAILORMADE TRANSPORT

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MATURATION

- ▪ = process towards the adult or mature state
  - ✓ Timing: when does the 'peak height velocity' (PHV) occur
  - ✓ Tempo: growth rate, expressed in cm/y
  - ✓ Status: pre-mid-post growth spurt

- ▪ Inter-individual differences in growth (early – average – late)
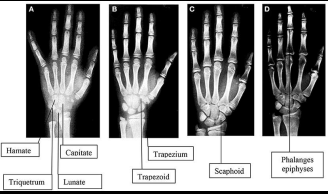 - ✓ Unstable, non-linear development of performance characteristics (Malina, 2004)

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ASSESSMENT

- Invasive
  - ✓ Skeletal (bone) age (by X-ray) → maturity status
  - ✓ Review 2021 (Cavallo)

	Method	Disadvantages	Advantages	Radiation risk
GP	Visual inspection Correspondence method	Greater variability between observers compared to the TW method	Quick execution Used by more than 76% of pediatricians	Very low
TW	Visual and scoring method: the sum of scores reflects general skeletal development	Subjective evaluation of bone age. Takes time	More reliable than GP method	Very low
Fels	More reliable than GP method	Limited experience	Standardized evaluation of errors Useful for forensic use	Very low
Computerizedassisted techniques	Computerized calculation of bone age using wrist radiographs	Automated evaluation, but not totally eliminated radiologist and pediatrician evaluation	Accuracy Precision	Very low
Ultrasound	The technique uses growth cartilages dimensions in three orientations: front, back and side	Operator-dependent Difficulty of standardization Needs further improvements	Accessibility Quick scan Low cost Multiplanar capacity Comparison with contralateral	Absent

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ASSESSMENT

- Non-invasive (Towlson, 2021)
  - ❑ Maturity offset
    - ✓ Mirwald, 2002: APHV prediction – appropriate for average maturing boys
    - ✓ Moore, 2015: equation without SH – appropriate for average maturing boys
    - ✓ Fransen, 2018: maturity ratio – within various ethnic groups

  - ❑ Khamis-Roche (1994): prediction/estimation of adult stature (mid-parental height)
    - ✓ Validated against X-rays → error of 2.5 to 7.3cm
    - ✓ Baxter-Jones (2013): PHV between 88-96% of predicted adult height, peaking at 92%
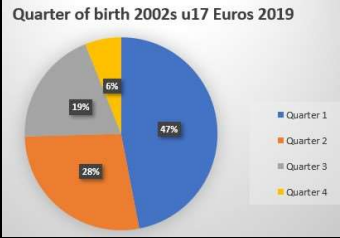
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SELECTION BIAS - CONSTRAINTS

Quarter of birth 2002s u17 Euros 2019

- Quarter 1 47%
- Quarter 2 28%
- Quarter 3 19%
- Quarter 4 6%

- 2 selection mechanisms
  - ✓ Relative age effect (RAE) (6-11y)
  - ✓ Maturation by the growth spurt (11-16y)

- Mechanisms based on physical & psychological advantage for early maturing players in sports where size, strength and speed are important performance characteristics.

- Selection not based on 'potential talent', although on temporary growth-related benefits compared to peers → INDIVIDUAL FOLLOW-UP OF ANTHROPOMETRICAL AND PERFORMANCE CHARACTERISTICS
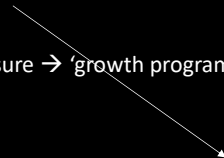
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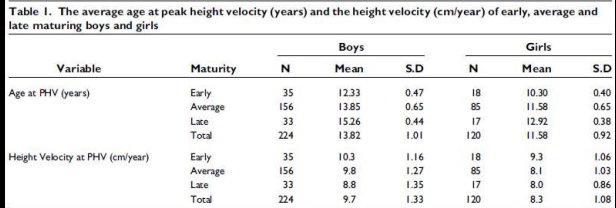## IN PRACTICE

- Monthly assessment of anthropometrical characteristics (stature and body weight) → standardized
  - ✓ Longitudinal follow-up from U11 until U16/U18
  - ✓ Determine height velocity (cm/y) with cut-offs (Mirwald, 2002)
  - ✓ Individual growth curve
  - ✓ Adjust the training process & game exposure → 'growth program' (monthly)
  - ✓ Follow-up RPE and wellness

- Centralized dataplatform (ClubLAB)

- NOTE: it is not the search for late maturing players!

Table 1. The average age at peak height velocity (years) and the height velocity (cm/year) of early, average and late maturing boys and girls

Variable	Maturity	Boys			Girls		
		N	Mean	S.D	N	Mean	S.D
Age at PHV (years)	Early	35	12.33	0.47	18	10.30	0.40
	Average	156	13.85	0.65	85	11.58	0.65
	Late	33	15.26	0.44	17	12.92	0.38
	Total	224	13.82	1.01	120	11.58	0.92
Height Velocity at PHV (cm/year)	Early	35	10.3	1.16	18	9.3	1.06
	Average	156	9.8	1.27	85	8.1	1.03
	Late	33	8.8	1.35	17	8.0	0.86
	Total	224	9.7	1.33	120	8.3	1.08

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INPUT

Date	Length	Weight
02/03/2022	175	56
02/02/2022	173.4	55
28/12/2021	173.4	55.3
17/11/2021	171.8	54.4
31/08/2021	170.3	
28/07/2021	169.9	52.7
02/06/2021	167.9	50.1
15/05/2021	167.9	48.2
06/04/2021	166.6	48.8
15/08/2020	160.2	43.8
13/07/2020	159	42.3
30/05/2020	157.9	41.3
15/02/2020	156.2	40.7
01/02/2020	155.7	39.9
03/01/2020	155.7	39.9
02/11/2019	154.9	39.5
12/10/2019	154.6	39.5
14/09/2019	154.3	39.3
16/08/2019	153.7	39.1
13/07/2019	153.4	38.3
04/05/2019	152.6	37.7
13/04/2019	151.5	37.7
15/12/2018	150	36.7
10/11/2018	150	36.8
06/10/2018	149.9	36.3
15/09/2018	148.8	35.8
22/08/2018	148.1	36
20/01/2018	145.5	33.8
02/12/2017	144.9	34.2
28/10/2017	144.6	33.7
23/09/2017	143.9	33.8
26/08/2017	143.5	33.9

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NO SWEAT NO GLORY

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OUTPUT – GROWTH PROGRAM

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Growth Speed

	Growth Speed
Last two tests	10.8
Last four tests	10.5
Last year tests (# 9)	9.1

Peak Height Velocity

	Age	Current Age
PHV	14.37	15.18

Adult stature prediction: 178.6 cm

	Length
Father	176 cm
Mother	168 cm

Type	2020-08-15	2021-04-06	2021-05-15	2021-06-02	2021-07-28	2021-08-31	2021-11-17	2021-12-28	2022-02-02	2022-03-02
Weight	43.8	48.8	48.2	50.1	52.7		54.4	55.3	55.0	56.0
Length	160.2	166.6	167.9	167.9	169.9	170.3	171.8	173.4	173.4	175.0

- Growth speed cut-offs
  - ✓ 0,5 cm/mo → 6 cm/y
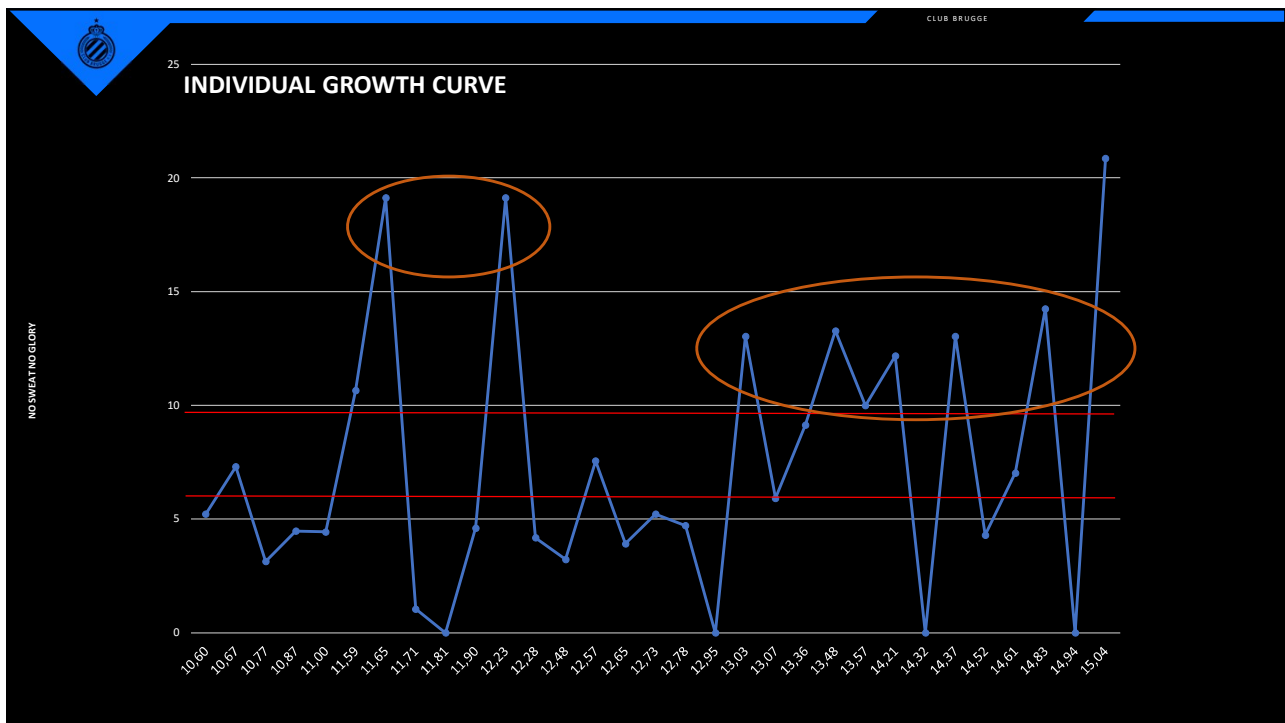 - ✓ 0,8 cm/mo → 9,6 cm/y

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Slide 17

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PHV & PERFORMANCE

Philippaerts, 2006

~~"windows of opportunity":~~

Absence of "sensitive periods", most components of fitness are trainable during the development continuum → adjust in volume & intensity in "periods of accelerated gains"

NO SWEAT NO GLORY

Table III. Mean growth velocities in different physical fitness tests when individual data are aligned on peak height velocity (PHV).

Motor tests		Months from PHV				
		−12	−6	0	6	12
FBA (attempts·year^{-1})	mean	0.1	1.2	2.5	1.2	0.1
	n	12	12	12	12	10
PLT (s·year^{-1})	mean	0.7	0.7	0.8	0.6	0.5
	n	9	9	9	9	8
SAR (cm·year^{-1})	mean	1.0	0.6	−0.1	1.3	2.7
	n	9	9	8	8	8
SLJ (cm·year^{-1})	mean	6.3	8.4	10.5	10.1	10.1
	n	10	10	10	10	10
VTJ (cm·year^{-1})	mean	1.5	3.3	5.1	3.8	3.3
	n	12	12	12	12	12
SUP (sit-ups·year^{-1})	mean	0.4	1.5	2.7	1.6	0.8
	n	11	11	11	11	10
BAH (s·year^{-1})	mean	−2.9	2.2	7.6	6.1	5.2
	n	17	17	16	16	16
SHR (s·year^{-1})	mean	0.4	0.9	1.6	0.7	0.1
	n	14	14	14	14	12
SSPRINT (s·year^{-1})	mean	0.1	0.4	0.9	0.5	0.2
	n	12	12	10	10	9
DASH (s·year^{-1})	mean	−0.6	−0.1	0.4	0.3	0.2
	n	8	8	8	8	7
ESHR (min·year^{-1})	mean	0.1	0.6	1.5	0.7	0.0
	n	12	12	11	11	9
STEMPO (s·year^{-1})	mean	1.4	2.1	3.5	2.9	2.6
	n	15	15	14	14	14

Note: Number of participants (n) can vary between tests at successive half-year intervals before and after age at PHV. Boys whose maximal velocity points were located at V1 or V7 (or V5 for those who were examined four times) were excluded because it is likely that the real maximal velocity was located before V1 or after V7 (or V5).
Abbreviations: FBA = flamingo balance; PLT = plate tapping; SAR = sit and reach; SLJ = standing long jump; VTJ = vertical jump; SUP = sit-ups; BAH = bent arm hang; SHR = 10 × 5 m shuttle run; SSPRINT = 5 × 10 m shuttle sprint; DASH = 30 m dash; ESHR = endurance shuttle run; STEMPO = anaerobic capacity as measured by a shuttle run.

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INDIVIDUAL FOLLOW-UP

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- Objective TID testing
  - ✓ Basic physical characteristics
    - Coordination (Moving boxes)
    - Flexibility (SAR)
    - Endurance (YYIR1)
    - Speed-agility (30m sprint – T-test)
    - Strength (CMJ)
  - ✓ Standardized conditions (indoorhal)
  - ✓ 3 times/season
  - ✓ Benchmarks (age & position)
  - ✓ Maturity → combining data

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INDIVIDUAL FOLLOW-UP

- Objective TID testing
  - ✓ Motor coordination → maturity independent!

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INDIVIDUAL FOLLOW-UP

- Player profile (benchmark)

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Physical Profile: 28/03/2022 ,

Anthropometry

	Unit	Date	Result	Benchmark Result	Score
Height	cm	03/02/2022	189.6	191.4	81-100%
Fat%	%	/		9.6	UNKNOWN

Sprint

		Unit	Date	Result	Benchmark Result	Score
Start Strength	5m	s	28/09/2021	1.064	1.029	21-40%
Start Speed	10m	s	28/09/2021	1.778	1.762	21-40%
Acceleration	20m	s	28/09/2021	3.016	3.018	41-60%
Maximal Speed	30m	s	28/09/2021	4.194	4.206	41-60%

Endurance

		Unit	Date	Result	Benchmark Result	Score
Intermittent Endurance Capacity	YYIR1	m	19/02/2020	2,480	2,335.8	61-80%
	YYIR1_submax	%	19/05/2021	80.0	84.3	61-80%
Recovery Power	YYIR1_rec_30"	m	19/05/2021	15.6	10.4	81-100%
Recovery Capacity	YYIR1_rec_1'30"	m	19/05/2021	36.9	28.9	81-100%
Maximal Oxygen Uptake	VO₂max	ml/kg/min	09/11/2021	61.0	58.4	61-80%
	HF max	beats/min		200	200	41-60%
Maximal Aerobic Speed	v_AER	km/h	09/11/2021	12.6	11.3	81-100%
	%VO_AER	%		77.0	73.8	21-40%
Maximal Anaerobic Speed	v_ANAER	km/h	09/11/2021	15.3	14.6	61-80%
	%VO_ANAER	%		91.0	90.1	21-40%

	Unit	Zone 1 Recovery	Zone 2 Extensive long	Zone 3 Extensive short	Zone 4 Intensive endurance	Zone 5 Intensive tempo	Zone 6 Extensive interval	Zone 7 Intensive interval
Heartbeat	beats/min	<150	150 - 160	160 - 174	174 - 181	181 - 188	188 - 194	>194
Speed	km/h	<9.3	9.3 - 11.1	11.1 - 11.8	11.8 - 13.0	13.0 - 14.4	14.4 - 16.2	>16.2

Nordbord

	Date	Result	Benchmark Result	Score
Hamstrings (R)	29/12/2021	403	369	61-80%
Hamstrings (L)	29/12/2021	407	381	81-100%
Imbalance	29/12/2021	0.9	8	81-100%

Jump

		Unit	Date	Result	Benchmark Result	Score
Explosivity	CMJ hips	cm	29/12/2021	38.0	38.7	41-60%
Explosivity/Coordination	CMJ arms	cm	29/12/2021	41.4	44.3	21-40%

Agility

		Unit	Date	Result	Benchmark Result	Score
Speed Agility	T-Left	s	28/09/2021	8.184	7.894	1-20%
	T-Right	s	28/09/2021	8.133	7.930	1-20%
Dribble Run		s	/	/	/	UNKNOWN
Dribble Ball		s	/	/	/	UNKNOWN

Strength

		Unit	Date	Result	Benchmark Result	Score
Maximal Strength	Extension 60°/sec (R)	Nm	09/11/2021	250.1	184.9	81-100%
	Extension 60°/sec (L)	Nm	09/11/2021	253.4	183.7	81-100%
	Flexion 60°/sec (R)	Nm	09/11/2021	141.8	112.3	81-100%
	Flexion 60°/sec (L)	Nm	09/11/2021	147.2	107.3	81-100%
	Extension 240°/sec (R)	Nm	09/11/2021	143.6	116.9	81-100%
	Extension 240°/sec (L)	Nm	09/11/2021	157.6	118.8	81-100%
	Flexion 240°/sec (R)	Nm	09/11/2021	114.7	83.3	81-100%
	Flexion 240°/sec (L)	Nm	09/11/2021	115.8	78.5	81-100%
	Flexion Ecc 30°/sec (R)	Nm	13/10/2020	195.1	146.5	81-100%
	Flexion Ecc 30°/sec (L)	Nm	13/10/2020	181.2	139.0	81-100%
	Flexion Ecc 120°/sec (R)	Nm	13/10/2020	207.5	139.5	81-100%
	Flexion Ecc 120°/sec (L)	Nm	13/10/2020	186.4	135.7	81-100%
Relative Strength	Extension Quad (R)	Nm/kg	09/11/2021	3.30	3.03	61-80%
	Extension Quad (L)	Nm/kg	09/11/2021	3.30	3.00	61-80%
Ratio H/Q	Ratio H/Q 60°/sec (R)	%	09/11/2021	56.7	61.0	21-40%
	Ratio H/Q 60°/sec (L)	%	09/11/2021	58.1	60.5	41-60%
	Ratio H/Q 240°/sec (R)	%	09/11/2021	79.9	71.6	81-100%
	Ratio H/Q 240°/sec (L)	%	09/11/2021	73.5	67.3	61-80%
Mixed Ratio	Ratio Ecc H30°/con Q240° (R)	%	13/10/2020	1.30	41.46	21-40%
	Ratio Ecc H30°/con Q240° (L)	%	13/10/2020	1.17	41.53	21-40%

FMS

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INDIVIDUAL FOLLOW-UP

- Player profile (benchmark)
- Evolution
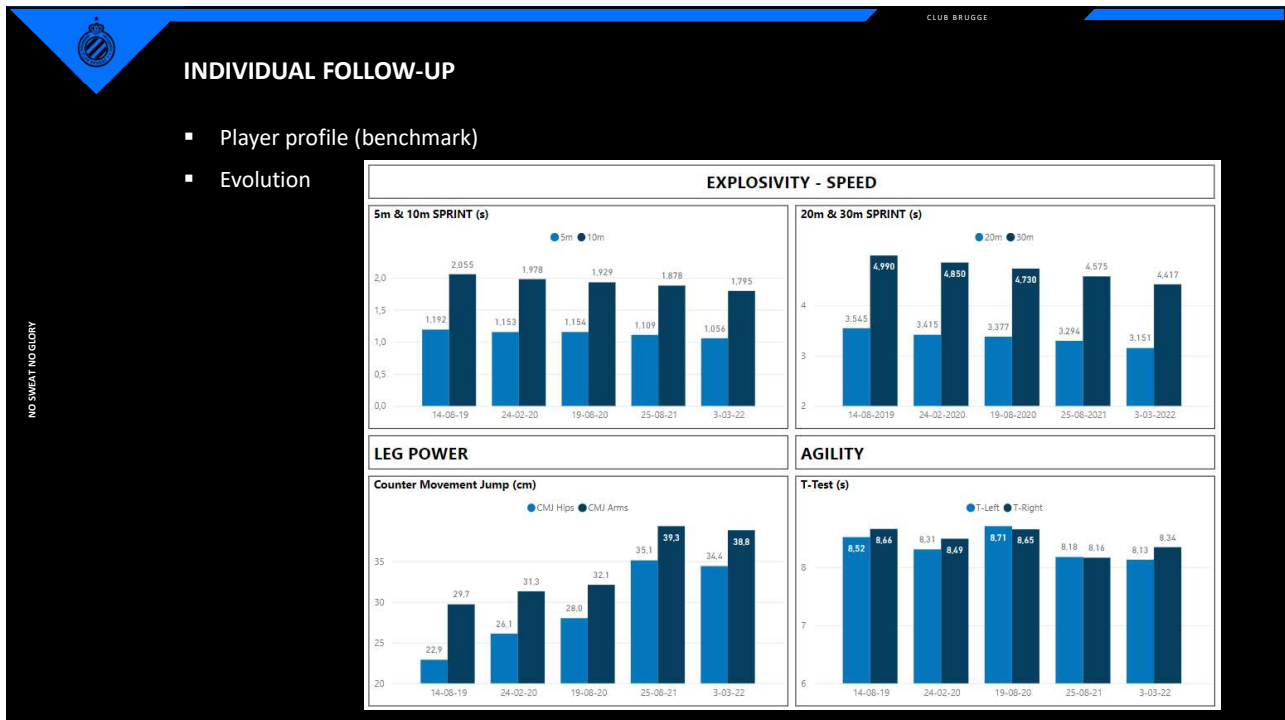
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INDIVIDUAL FOLLOW-UP

- Subjective evaluation
  - ✓ Questionnaire → basics & specifics

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FUTURE RESEARCH

NO SWEAT NO GLORY

- Relation maturity assessments and growth-related injuries → trend ↓

- GPS from U15 next season → control for load during the training session

- Impact/involvement → match-related performance

- Parental height assessments for proper estimation adult stature

- Automization of growth rates of physical performance characteristics in relation to growth

- Player & management app from U13

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