

GREAT BRITAIN PERFORMANCE PATHWAY BLUEPRINT

First edition 2020



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1. OVERVIEW



PURPOSE

The Great Britain Performance Pathway Blueprint, is a guide of the GB way to develop elite players and coaches.

AIM

It provides guidance on the performance standards required at each level of the pathway and the areas to be developed for each squad as they progress. Allowing all players and coaches to understand the expectations for each part of the pathway.

The document will be an ever-evolving document that is adapted as the game, the players and coaches develop in the future

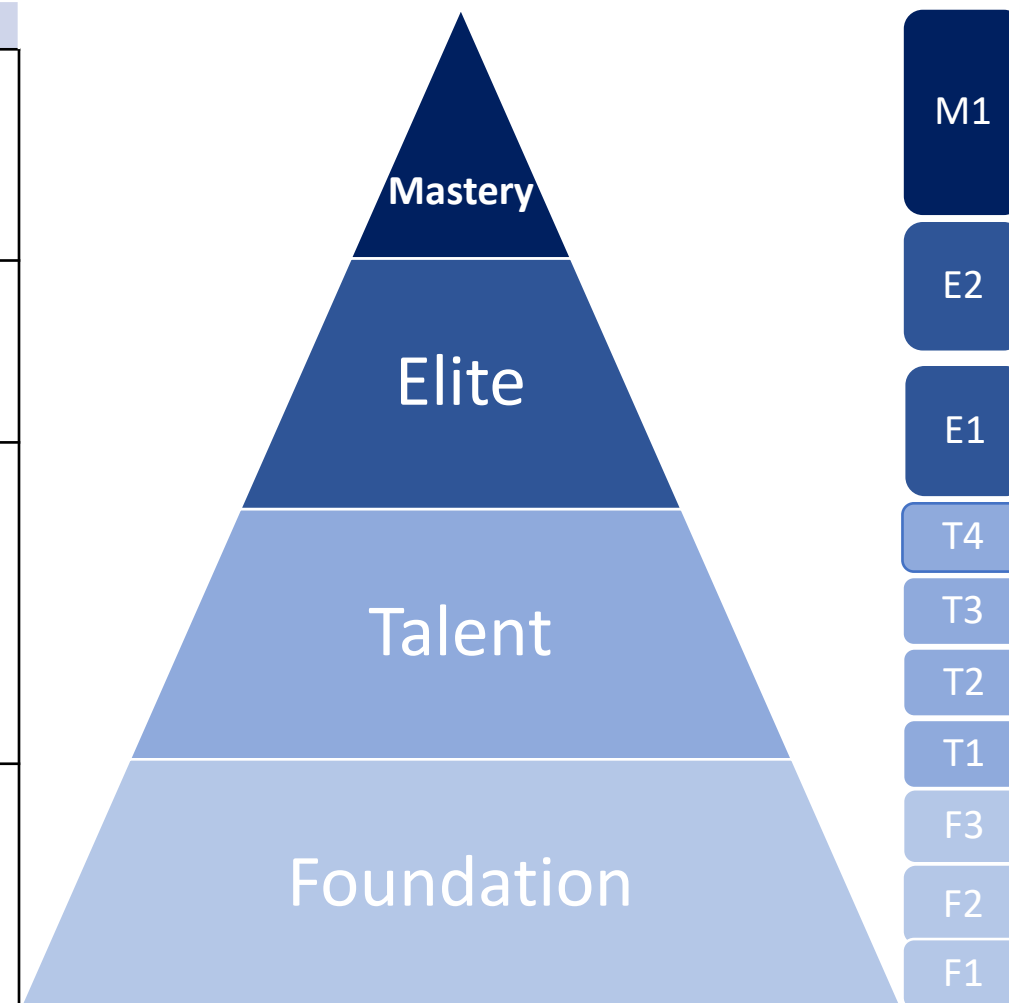
2. GOALS AND MISSIONS



3. OVERVIEW OF THE PATHWAY



Age group	Technical Concepts	Tactical Concepts	
		Attack	Defence
Senior	<ul style="list-style-type: none"> Defensive 1x1; Offensive 1x1; Blocks; Screens; Dissuasion (lead attacker); Defensive cooperation; 	<ul style="list-style-type: none"> Complex TOTMs; SGS's (+/-1, 7x6,..); FB (1-, 2-waves); 	<ul style="list-style-type: none"> 3:2:1 system; 5:1 system; 6:0 system; Mixed systems; SGS's (+/-1, 7x6); Transition;
GB20		<ul style="list-style-type: none"> Basic TOTM's; Introduction of Complex TOTMs; FB (1-,2-waves); 	<ul style="list-style-type: none"> 3:2:1 system; 5:1 system; Intro to 6:0 system; Mixed systems; Transition;
GB18			
U16	<ul style="list-style-type: none"> Defensive 1x1; Offensive 1x1; Passing/catching; Shooting; Defensive and offensive cooperation; Blocks (shooting line) 	<ul style="list-style-type: none"> Intro to Basic TOTM's; Small group tactics; SGS's (+/-1); FB (1-, 2-waves); 	<ul style="list-style-type: none"> 1x1, 2x2, 3x3,... Mixed systems; 3:3 system; Intro to 3:2:1System; Intro to 5:1system; SGS's (+/-1); Transition;
U14		<ul style="list-style-type: none"> Elementary and Simple TOTMs; Small group tactics; FB; 	
U12	<ul style="list-style-type: none"> Basic running; 3 steps; Catching/passing; Shooting; Basic GK; Defensive stance. 	<ul style="list-style-type: none"> Basic movement; Individual tactics with and without ball; Width and depth notions; Small group tactics. 	<ul style="list-style-type: none"> Basic movement; Individual tactics with and without ball; Width and depth notions; Small group tactics.



3. GB PLAYER PRIORITY AREAS



Stage		Focus	High level	ETP level	Descriptor	Sub level	Op level	Competitive level	Agility	Balance	Coordination	Movement skills	Throwing skills	Catching skills	Tactical Attack	Tactical Defence	GK			
Foundation	F1	Basic movement foundation	Unclassified	Non Elite	Foundation of movement	None	Recreational	None												
	F2	Extension & Refinement of Movement Foundations	Active lifestyle					None	None											
	F3	Commitment to competing in Handball	Sport					Transition												
Talent	T1	Demonstration of potential against benchmarked criteria	Sport	Pre-elite	Potential to be elite	Potential emerging	Competitive Handball	EHA/SHA County/Regional competitions												
	T2	Verification of potential following a period of observational period																		
	T3	Practice & achieve				Emerging		U16 Regional Leagues												
	T4	Breakthrough & reward	Sporting excellence			Development		Performance Handball	U18-U21 Regional Leagues											
Elite	E1	Representation	Sporting excellence	Elite	GB International	GB Development Squad	Performance Handball	Senior national league or top 3 league in European Handball	Be a selected member of a GB squad competing at international level in benchmarked or other international events											
	E2	Success				Senior GB squad member	High Performance Handball													
Mastery	M1	Sustained success at E2	Sporting excellence	Elite	GB International	Playing at a top club in Europe	High Performance Handball	Champions League	Be an integral member of the GB squad											

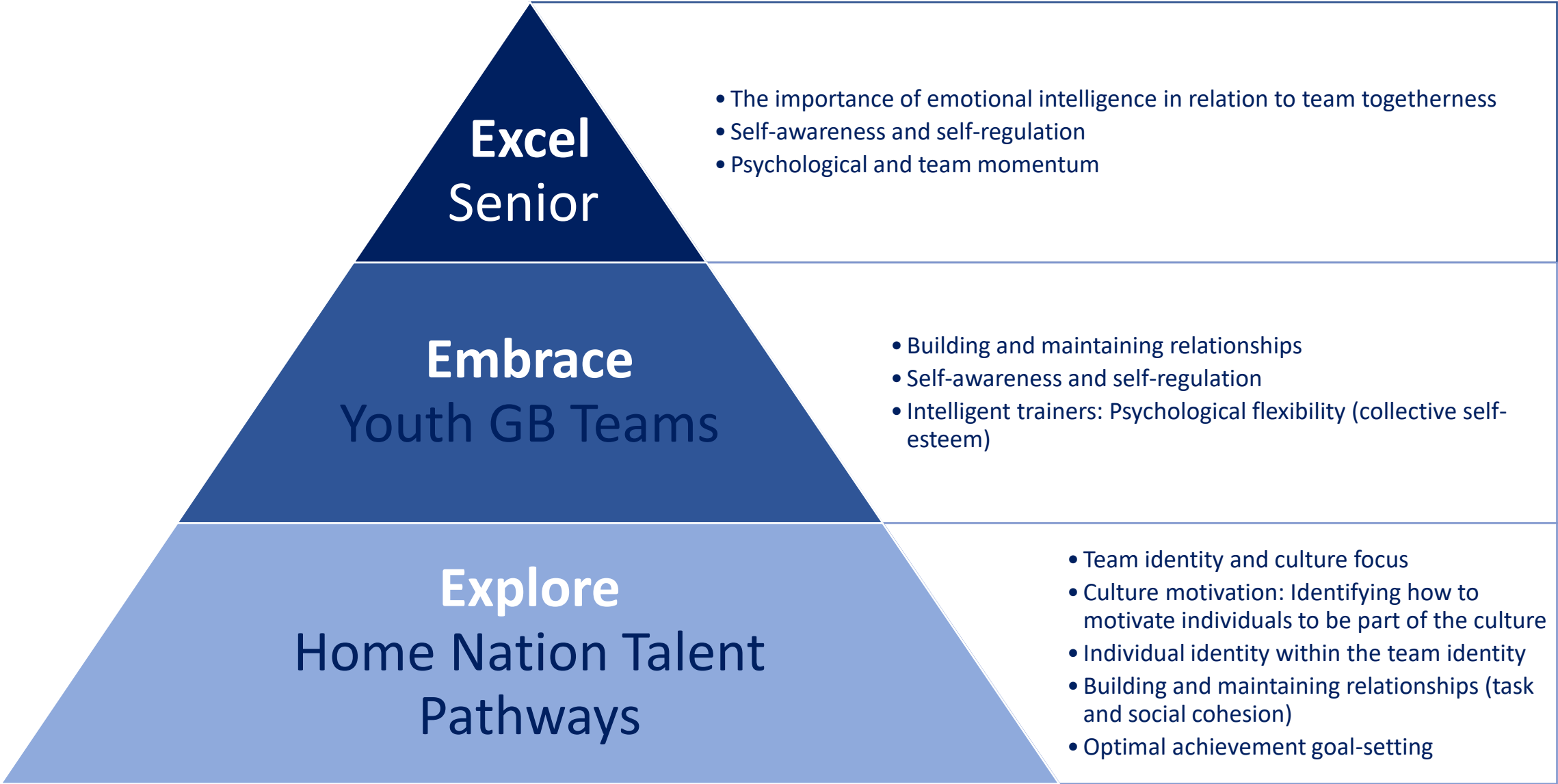
3. GB COACH ABILITY PER LEVEL



Stage		Focus	Descriptor	Sub-level	Op level	Competition level	The coach will have the ability to...	
Foundation	F1	Basic movement foundation	Foundation of movement	None	Recreational	None	<ul style="list-style-type: none"> Coach the core skills, identify and correct weaknesses Develop basic concepts to develop and understanding of handball through small sided games 	
	F2	Extension & Refinement of Movement Foundations				None		
	F3	Commitment to competing in Handball				Transition		
Talent	T1	Demonstration of potential against benchmarked criteria	Potential to be Elite	Potential emerging	Competitive Handball	EHA/SHA County/Regional Competitions	<ul style="list-style-type: none"> Identify and correct fundamental movement patterns within technical skills Instruct on basic tactical structures within training and games Apply evidence based coaching techniques and basic sports science theory Identify and correct fine motor skills Identify and correct subtle tactical adjustments throughout training and games Develop a range of evidence based coaching techniques and sports science theories. Develop skills on longer term programme development and display leadership characteristics 	
	T2	Verification of potential following a period of observational period				U16 Regional Leagues		
	T3	Practice & achieve		Development		Performance Handball		U18-U21 Regional Leagues
	T4	Breakthrough & reward						
Elite	E1	Representation	GB International	GB Development squad	Performance Handball	Senior national league or top 3 league in European Handball	<ul style="list-style-type: none"> Develop training and competition programmes for the continuous development of high performance players to an agreed budget Regularly liaise with and monitor national players outside the UK. Develop and manage in agreement, the necessary player support programmes. Continually develop, update, monitor and report on the performance criteria against which the programme and players will be evaluated. 	
	E2	Success		Senior GB squad member	High Performance Handball			
Mastery	M1	Sustained success at E2	GB International	Playing at top level in Europe	High Performance Handball	Champions League	<ul style="list-style-type: none"> Be responsible for the identification of players for selection into the GB programme. Liaise and communicate with the other high performance/national team coaches on the effective use of resources and sharing of knowledge and expertise. 	

4. CULTURE AND PSYCHOLOGICAL DEVELOPMENT

Culture and Mindset Framework



4. APPLYING THE PSYCHOLOGICAL ASPECTS



EXCEL: SENIOR GB TEAMS

GB Values:

- Meaning, belonging, ambitious Responsibility, commitment, Pride, Accountability, Teamwork, Leadership skills, role model, Respect, Cooperation, Excellence, Integrity, conscientious, strength

Personality Traits/Psychological Concepts

- Compromise, Emotional Control, Communication, Confidence, Focus, Courage, Resilience, Altruism, Honesty, Loyalty
- Physically informed, motivated and driven, intelligent trainers, fast, mental toughness, self-managers

Team togetherness

- Team vision, identity, values, and common language (shared understanding)
- More egotistical goal-orientation vs. task goal-orientation
- Collective self-esteem

Psychological and team momentum

- Hedonic (pleasure, happiness, and enjoyment) goal orientation
- Coach-athlete relationship
- Transformational leadership
- Motivational climate

EMBRACE: YOUTH GB TEAMS

Lifestyle and wellbeing management:

- Emotional intelligence and team togetherness: Building emotional connections. Understanding team dynamics, and essential ingredients required for strong team chemistry
- Self-awareness and self-regulation
- Intelligent trainers: Game intelligence, mental toughness, psychological flexibility, emotional control
- Motivational climate
- Mental toughness development
- Optimal achievement goal-setting and reflective practise

EXPLORE: HOME NATION TALENT PATHWAYS

GB vision, values, behaviours:

- Assessing personality characteristics/GB mentality
- Individual identity within team identity
- Optimal achievement goal-setting
- Self-confidence and self-enhancement training
- Growth and process-orientated mindset
- Intelligent trainers: Game intelligence, mental toughness, psychological flexibility, emotional control

5. TECHNICAL AND TACTICAL CONCEPTS

Overview of the GB Concepts Focus



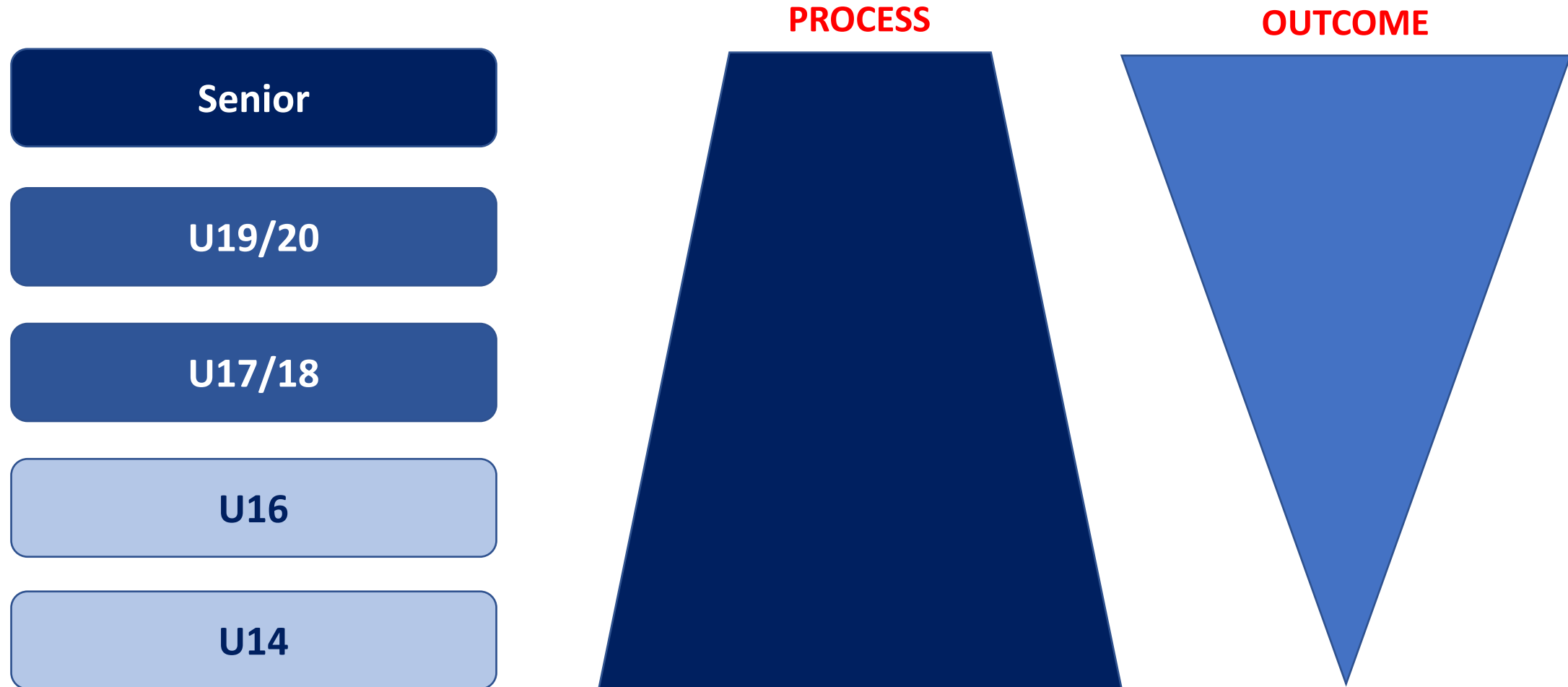
Generic Defensive Concepts

- Decision Making: when and how to act;
- Ability to solve 1x1 situations;
- Recognition of cooperation contexts;
- Focus on recovering the ball: anticipatory movements;
- Pro-active: force mistakes;
- Knowledge, understanding and execution of the systems inside our model.

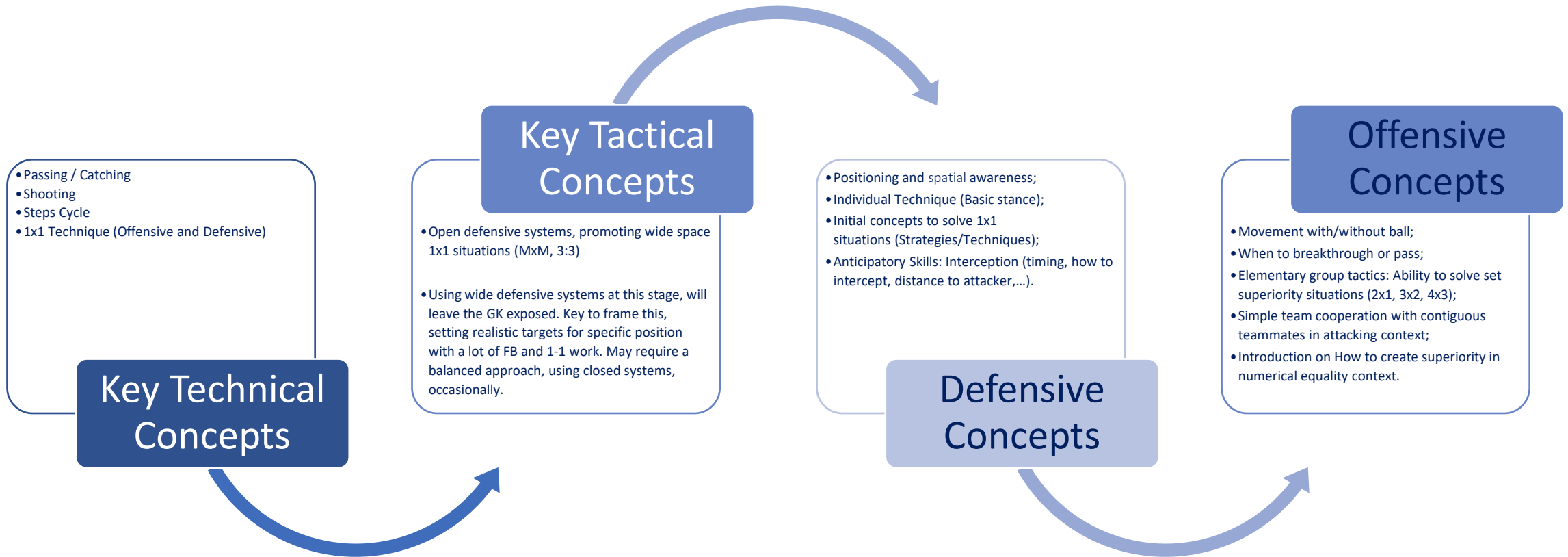
Generic Offensive Concepts

- Decision Making: interpretation (visual) and execution (motor) skills;
- Movement with/without ball;
- Ability to create superiority situations;
- Fast Game & Safe Game: generate easy scoring opportunities;
- Knowledge, understanding and execution of the systems inside our model.

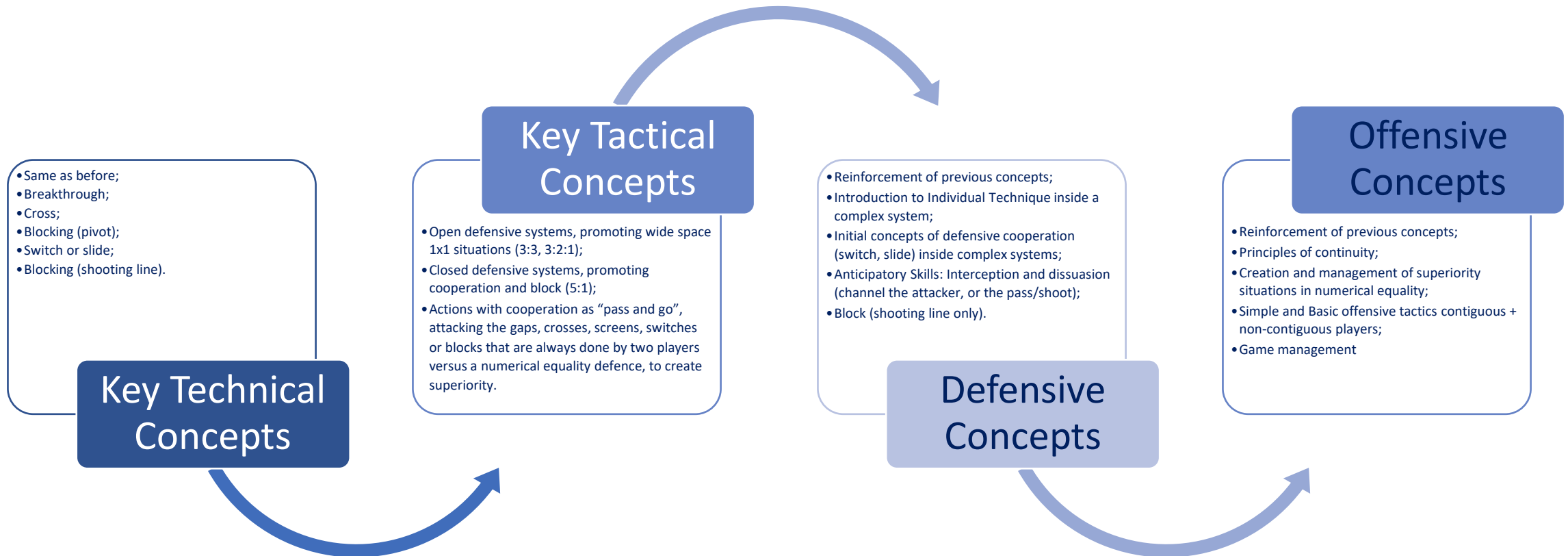
5. PROCESS VS OUTCOME EXPECTATIONS



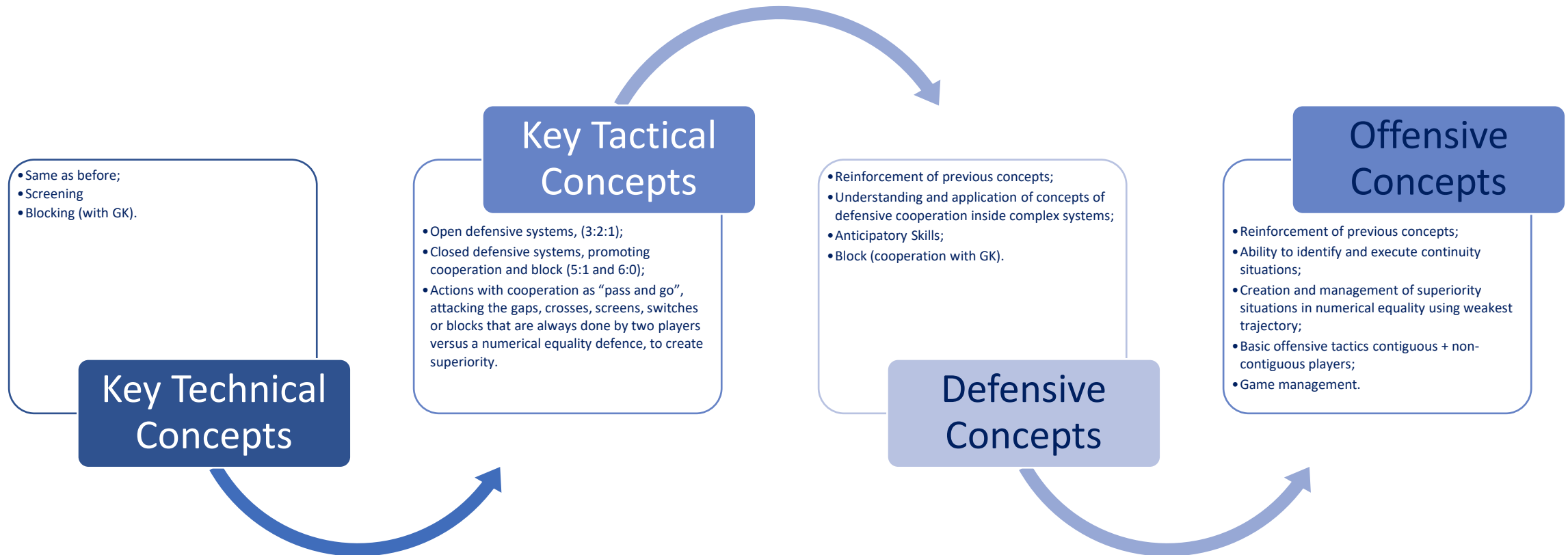
5. U14 AGE GROUP: F1-F3 Level



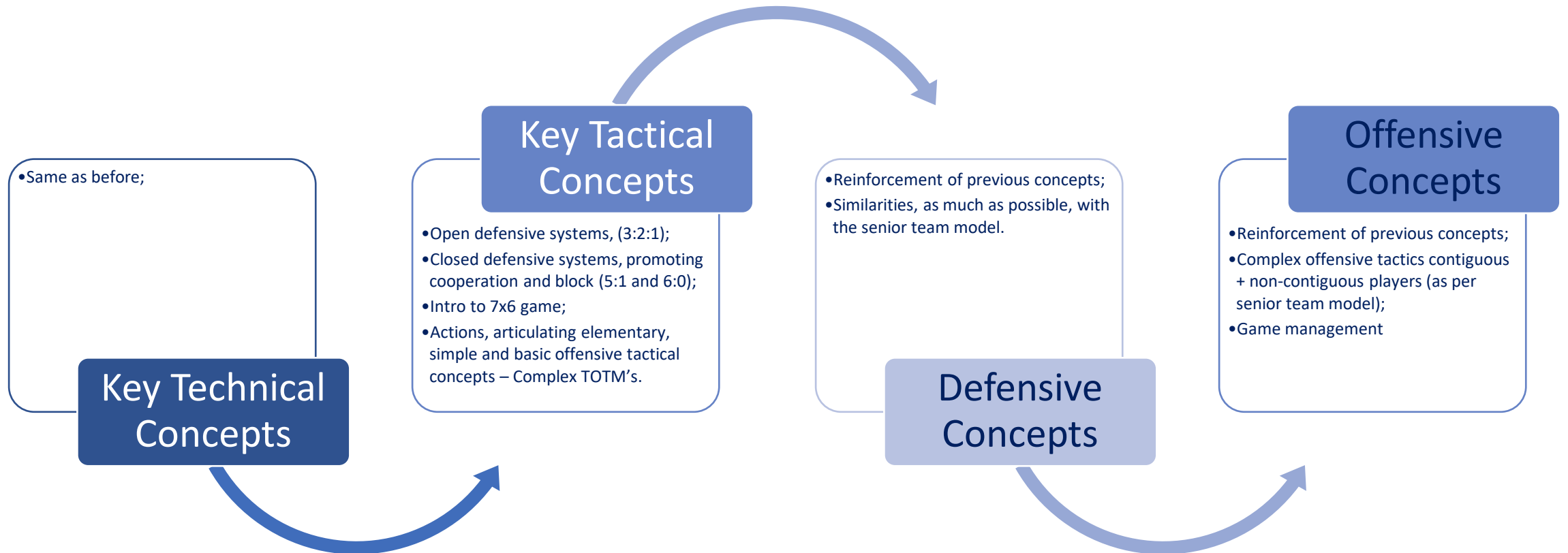
5. U16 AGE GROUP: T1-T4 Level



5. U18 AGE GROUP: T1-T4 Level



5. U20 AGE GROUP: E1-E2 Level



5. CONCEPTS PER POSITION



BACK / PM

- Decision making with/without contact;
- Trajectories;
- Shooting ability;
- Passing ability;
- Ability on 1x1 situations.

WINGS

- Speed on FB;
- Shot selection;
- Movement with/without ball inside and outside defences;
- Ability to receive the ball in hard contexts (one hand).

LINE PLAYERS / PIVOTS

- When to block or run;
- Shot selection;
- Specific 1x1 situations;
- Ability to receive the ball in hard contexts (one hand).

5. TIMELINE FOR TACTICAL CONCEPTS



Elementary : Superiority situations in attack where there exists cooperation between teammates – 2x1, 3x2 or 4x3.

Simple: Simple situations of numerical equality, like the movement of the ball or players to different positions, that are present in any game level.

Basic: A group of actions with cooperation as “pass and go”, attacking the gaps, crosses, screens, switches or blocks that are always done by two players versus a numerical equality defence.

Complex: Imply the participation of a larger number of teammates and consist on the articulation of all the above-mentioned means.

6. PHYSICAL DEVELOPMENT



Women's physical development

Age	30/15 IFT	RAST	10m	20m	Pro Agility Test	CMJ SJ	IRM Squat	FMS	Throwing Velocity
U17	>15 Kph	Relative max power >7.5 W/kg	<2.20 sec	<3.40 sec	<5 s	>20 cm-CMJ >15 cm-SJ	1.2 x Body mass	>18	18-20 m/s
U19	>16 Kph	Relative max power >8.3 W/kg	<2.10 sec	<3.30 sec	<4.95 s	>25 cm-CMJ >20 cm-SJ	1.5 x Body mass	>18	22 m/s
Senior	>18 Kph	Relative max power >8.5 W/kg	<1.95 sec	<3.20 sec	<4.9 s	>30 cm-CMJ >25 cm-SJ	2 x Body mass	>18	27 m/s

Men's physical development

Age	30/15 IFT	RAST	10m	20m	Pro Agility Test	CMJ SJ	IRM Squat	FMS	Throwing Velocity
U18	>16.5 Kph	Relative max power >8.2 W/kg	<2.10 sec	<3.30 sec	<5 s	>30 cm-CMJ >25 cm-SJ	1.5 x Body mass	>18	19-20 m/s
U20	>17.5 Kph	Relative max power >9 W/kg	<2.00 sec	<3.20 sec	<4.95 s	>35 cm-CMJ >30 cm-SJ	1.7 x Body mass	>18	23-25 m/s
Senior	>18.5 Kph	Relative max power >9.5 W/kg	<1.90 sec	<3.10 sec	<4.8 s	>40 cm-CMJ >35 cm-SJ	1.7 - 2.2 x Body mass	>18	24-28 m/s

7. GOALKEEPER DEVELOPMENT:

Technical and Tactical Concepts



- Underpinned Perception – Action Coupling (context specific action).
- COORDINATION (Hand-eye; Segmental; Motor);
- Static and dynamic balance (context specific);
- Basic position (focus on balance) from static stance;
- Ball manipulation;
- Passing ad different distances;
- Using different body parts to save the ball;
- Intro to positioning, taking in account the position of the ball & goal

- Reinforcement of previous concepts;
- Agility, balance and coordination;
- Refine/adapt technique to specific GK characteristics;
- Specific techniques per shooting zone
- Basic position from dynamic context;
- Decision making in relation to distance;
- Quick re-start (save to keep the ball close);

- Reinforcement of previous concepts;
- Development of all perceptual motor skills;
- Cooperation with defenders in different systems (depths);
- Tactical and technical decision making
- Communication and feedback to defenders

- Reinforcement of previous concepts;
- Why/when/how to apply different techniques and tactical actions;

7. GOALKEEPER DEVELOPMENT:

Shooting Context



9M:

- Feet slightly further apart than shoulder width;
- Slightly raised heels;
- Skipping, feet off the ground as little as possible and always in contact with the ground;
- Slightly flexed knees;
- Hip slightly behind shoulder line;
- Hands between chest and eye line, within the range of sight (If the GR is taller you may assume a lower position).
- Elbows aligned with torso;
- Shoulders aligned with the position of the ball (ball line between shoulders)

Shot indicators

- Trajectory and jump;
- Arm and torso in relation to defender (block/contact).
- Position & proximity of defender.

6M (Breakthrough and Pivot):

- Feet shoulder width & in balance at point of shooter 'take off'
- Slightly raised heels
- Skipping, feet off the ground as little as possible and always in contact with the ground;
- Slightly flexed knees
- Hip aligned with shoulder line
- Hands above the head, elbows slightly flexed, on the shoulder line or forward (grow to the ball)

Shot indicators

- Trajectory;
- Pivot rotation - Take the shot to the side of the rotation;
- Position of the arm.

Moments of defence

- Time to prepare: GK analyses the shot indicators and covers the shooting arm
- Without time: GK should cover as much goal space as possible and analyse shot indicators
- Shooter with his back towards goal: GK should be aggressive and advance further towards him so that when he turns around, he sees as little as possible of the goal.
- Shooter is in contact with the defender in the central zone: GK should move forward 1/2 step to ensure shooting angle is smaller and give time to read the shot, which is more likely to leave with less force and accuracy.
- Shooter is in contact with the defender in the lateral areas: GK should be closer to the goal line

WING:

- Body parallel with side-line as wing receives the ball
- Feet shoulder width apart & in balance as winger progresses to 6m
- Slightly raised heels
- Skipping, lift your feet off the ground as little as possible and always have a support on the ground
- Slightly flexed knees
- Hip lined with shoulder line
- Arm closest to the post should be above the head to cover the space of goal, arm furthest from the post should be slightly bent to cover the rest of the space at 2nd post, head height
- Elbows aligned with torso
- To offer the 2nd post the GK should move forward with the foot closest to the post on the side of the shot, towards opponent's jumping foot.
- To offer the 1st post the GK should move forward with the foot furthest away from the post, towards the defender closest to the wing (indication).

Shot indicators:

- Jump direction
- Position of the arm



Example Training Processes per level of pathway



Culture and Psychological Development

Concept Explanation

Measurement Tools and Research



Defence Systems

3:3, 3:2:1, 4:2, 5:1, 6:0



Physical Development Example Sessions

Speed

Endurance

Agility



Physical Training Load Monitor



Handball Specific Complex Test

Benchmarks Research



Traditional Testing Protocol

Benchmarks Research

EXAMPLE TRAINING PROCESS



Stage		Focus	Training process	Per week
Foundation	F1	Basic movement foundation	Techniques: - Basic running, direction changes, skipping, running backwards, stopping Three steps, gripping the ball, catching, passing, agility, dribbling (without opponent), basic stance (GK)	X2
	F2	Extension & Refinement of Movement Foundations	Techniques:- Repetition of all the elements in F1, passing and catching in movement, Run-up. Jump shot, shooting (unopposed), basic GK technique, introduction to obstructing the attacker	X2
	F3	Commitment to competing in Handball	Techniques:- Repetition of the technical fundamentals in F1 & F2, mastering ball reception and passing whilst moving, first stage positional (back court and pivots), individual GK technique, mastering ground shots, jump shots against opponents and introduction of the dive shot, introduction of feints Tactics:- Individual group tactics, counter attack, double pass, 'width and depth", ball circulation, tracking player with and without the ball, blocking, man-to-man defence	x3
Talent	T1	Demonstration of potential against benchmarked criteria	Techniques:- Consolidation of the perfected technical elements without the ball, mastering technical elements with the ball and their consolidation, further position related specialisation in attack (shooting, types of shot), mastering play in attack/defence 1:1. Tactics:- Crossing, screening, 2 nd pivot play, return defence, man-man, introduce 3:3 or 3-2-1 defence, +1 and -1 play, 3v3 and 4v4v play, group tactics in defence (taking over, double block), creating pressure, collective counter attack, fundamentals against 'shallow' and 'deep' defences, introduction of 6:0 and 5+1 defence, individual technical training with the most talented individuals	x3/4
	T2	Verification of potential following a period of observational period	Tactics:- Increase in training load, development of cooperation between players in attack and defence, 2v2, 3v3 and 4v4 situational play	x3/4
	T3	Practice & achieve	Tactics:- Increased match schedule at appropriate levels, planned attack actions against various defensive formations (players to recognise in competitive situation, give responsibility for the tactical elements at times in the games, position-specific defence work for positions 1 & 6 and 3 & 4 in 6:0 defence, high tempo, mastering play +1 situations, solve problems -1 situation	x4
	T4	Breakthrough & reward	Nothing should be new on the technical front at this stage, but technical elements should be repeated to consolidate the skills, high tempo, develop personal styles, increased load for best players, close cooperation with the coaches, increased match schedule to test competencies, settle on 2/3 positions in attack and defence, extended playing time for the most promising players to allow the solving of complex tasks	x4
Elite	E1	Representation		
	E2	Success		
Mastery	M1	Sustained success at E2		

CULTURE AND PSYCHOLOGICAL CONCEPT



Explore

Team identity and culture focus workshop

Individual identity within the team identity workshop

Building and developing task and social cohesion workshop

Embrace

Building and maintaining relationships workshop

Emotional intelligence and team togetherness workshop

Collective self-esteem workshop

Excel

Intelligent trainers: Psychological flexibility workshop

Self-awareness and self-regulation workshop

Psychological momentum workshop

CULTURE AND PSYCHOLOGICAL: Measurement Tools and Research



Measurement tools:

- Coaching Behaviour Scale for Sport (CBS-S), Coté, J., Yardley, J., Hay, J., Sedgwick, W., & Baker, J. 1999
- The team performance profile (Butler & Hardy, 1992)
- Collective Efficacy Questionnaire, Short, S. E., Sullivan, P., & Feltz, D. L. 2005
- Group Environment Questionnaire, Carron, A. V., Widmeyer, W. N., & Brawley, L. R. 1985
- Social Identity in Sport Questionnaire, Bruner & Benson, 2018

Further research references:

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DEFENCE SYSTEMS:

3:3

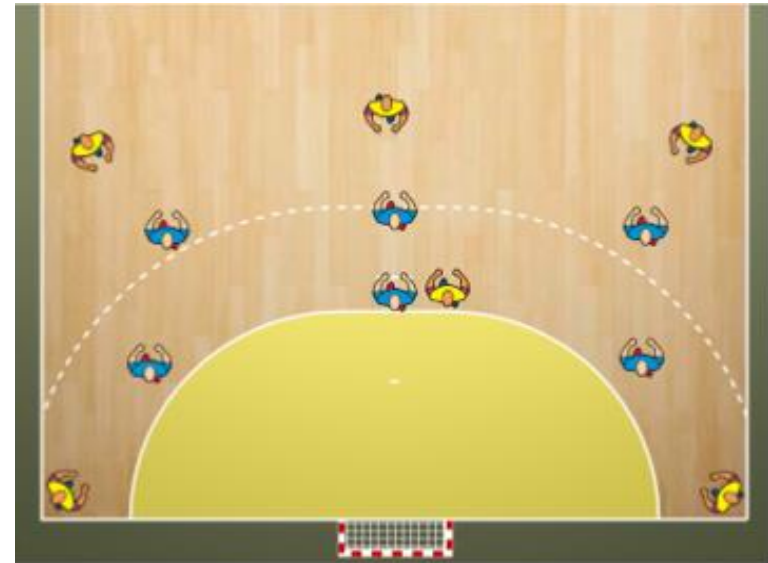


Set up & Main Goals

- 2 lines of 3 defenders;
- Mixed defensive system (zonal + man to man – depending on context);
- Goals
- Keep shooters away from goal;
- Keep back court players distant from the connection with line player;
- Improve defensive individual technique of our players.
- Improve communication and cooperation.

Basic Rules

- Respect the 2 lines (3 in front stay in a line just outside 9m – don't go above 10m);
 - Cover the “kill zone” – promote shots from wide areas (as in 3:2:1);
 - Zonal defence - when attackers cross in front of defenders, CHANGE PLAYER, DON'T CHANGE POSITION;
 - Defenders follow the transformation (when someone goes 2nd Line, his defender follows);
 - When Line goes out to block, defender steps out evading the block and tackling his opponent (same as 3:2:1);
- TACKLE, TACKLE, TACKLE!!!! Take the attack to passive game by constantly breaking the circulation of the ball.



DEFENCE SYSTEMS:

3:2:1



Set up & Main Goals

- Keep shooters away from goal;
- Keep back court players distant from the connection with line player;
- Improve defensive individual technique of our players.
- Improve communication and cooperation.

Basic Rules

- Cover the “kill zone” – promote shots from wide areas;
- Zonal defence - when attackers cross in front of defenders, CHANGE PLAYER, DON'T CHANGE POSITION;
- Centre back creates superiority on the zone of the ball (always in a straight line between ball and goal);
- Pivot is defended on a zonal basis;
- Nr 2 on the side of the ball is very aggressive (9 to 12m);
- Nr 2 on opposite side of the ball is on the 6m;
- Point defender very aggressive on PM when in possession and trying to avoid Back to Back pass when the backs have the ball;
- Nothing changes with Transformation (optional) – the immediate goal is to stop the ball circulation through tackling;
- When Line goes out to block, defender steps out evading the block and tackling his opponent;



TACKLE, TACKLE, TACKLE!!!! Take the attack to passive game by constantly breaking the circulation of the ball.

DEFENCE SYSTEMS:

4:2

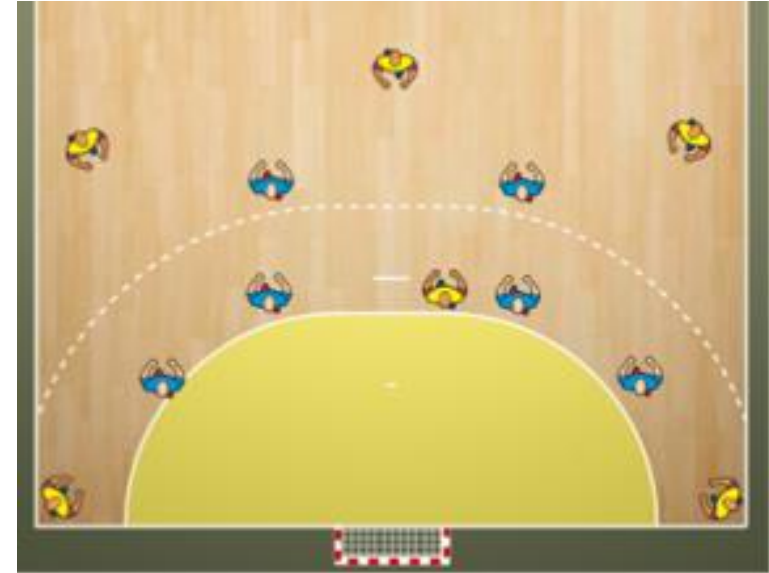


Set up & Main Goals

- “Surprise factor” – less utilized/practiced might create longer period for adaptation for the attackers;
- Antidote for anthropometric deficits;
- Prevent clearing zones for 1x1 with the centre backs;
- Proactive vs Reactive;
- Easier/faster 1st wave and post-goal re-start.

Basic Rules

- Superiority on the ball (similar to 3:2:1);
- Offer wider areas (always close strong trajectories) – we want the ball to be there as much as possible;
- Force the dribble or and risky passes;
- Prevent back to back passes;
- Switch opponent (respect the zones).



DEFENCE SYSTEMS:

5:1



Set up & Main Goals

- Promote shots from wide areas in cooperation with defensive block;
- Keep PM distant from the connection with line player;
- Disrupt ball circulation and offensive organization;
- Improve communication and cooperation.
- Specific behaviour and system changes/adaptations (rules) inherently related to opposition, it's systems and characteristics;

Basic Rules

- Superiority on the ball (similar to 3:2:1);
- Offer wider areas (always close strong trajectories) – we want the ball to be there as much as possible;
- Force the dribble or and risky passes;
- Prevent back to back passes;
- Switch opponent (respect the zones).



DEFENCE SYSTEMS:

6:0



Set up & Main Goals

- Promote shots from distance in close cooperation between GK and defensive block;
- Decrease space around 6m;
- Reduce 1x1 situations to the minimum;
- Increase support and cooperation as well as clear and concise communication;
- Specific behaviour and system changes/adaptations (rules) inherently related to opposition
- it's systems and characteristics;

Basic Rules

- No one enters the 9m zone unchecked – promote shots from distant areas;
- Zonal defence - when attackers cross in front of defenders, CHANGE PLAYER, DON'T CHANGE POSITION;
- Behaviour from defenders dependant on positioning of the PV and ball circulation as well as specific characteristics from attackers.

Key Aspects

- Defence needs to be pro-active and aggressive trying to regain possession of the ball;
- Anticipatory actions are key to break momentum, offensive organization and fluidity of ball circulation;
- Definition of who goes out and when, it's inherently connected to the specific characteristics of the defenders and opposition.



PHYSICAL PERFORMANCE DEVELOPMENT:

Speed



Acceleration 5m to 10m acceleration are the key distances for most positions, only on rare occasions do sprints last longer than 20m occur, with wing players sprinting the most. (Manchando et al, 2012)

Direct methods to improve acceleration/speed:

- Differential starts –standing, fall, lying, fly, multi-directional.
- Pulling resistance –bands, sleds, parachute
- Pushing resistance –partner resisted, prowler.
- Environment –uphill, downhill, stairs.(Lockie et al, 2012; Paradisis, Bissas and Cooke, 2009)

Indirect methods to improve acceleration/speed

- Weightlifting derivatives
- Loaded ballistic exercises (e.g. Squat jump)
- Plyometrics(Suchomel, Comfort and Lake, 2017; Rimmer and Sleivert, 2000)

For every 10mof sprint, a full 60-90 second rest is required to enable full recovery.(Lockie et al. 2012)

Total distance per session (m)	Sessions per week	Athlete level
80-160	1	Beginner
160-240	1	Early starter
240-360	1-2	Intermediate
360-500	1-2	Elite

Sample Beginner Sessions-155m

Exercise	Distance	Reps	Sets	Rest	Total Distance
5m lying (push up position) start	5m	3	1	30 seconds per rep	15m
5m fall start	5m	4	1	30 seconds per rep	20m
10m fly start	10m	3	1	60 seconds per rep	30m
10m fall start	10m	3	1	60 seconds per rep	30m
10m static start to 10m maintenance	20m	3	1	2 mins per rep	60m

Exercise	Distance	Reps	Sets	Rest	Total Distance
1Kg med ball chest push throw to 5m acceleration	5m	5	1	30 seconds per rep	25m
10m 3-point start	5m	4	1	60 seconds per rep	20m
10m fly start	10m	4	1	60 seconds per rep	40m
15m fall start	10m	3	1	90 seconds per rep	30m
10m static start to 10m maintenance	20m	3	1	120 seconds per rep	60m

Unloaded

- Beginner
- 5m fall starts
- 10m fly starts

- Uphill sprints
- Downhill sprints

Loaded

- Advanced
- Sled resisted sprints
- Prowler push sprints

PHYSICAL PERFORMANCE DEVELOPMENT:

Endurance



To best develop endurance, it is imperative to have Energy system specific focus for different stages of the year. For example; build an aerobic base during the pre-season HIIT sessions, while in season emphasise repeated sprint training.

Endurance for Handball is best developed through HIIT, and Small/medium/large sided games. In contrast, constant work rate such as extended jogs and runs can be used to reduce the amount of fatigue caused by strenuous HIIT work, and can also be used for athletes with repetitive strain injuries (e.g. shin splints)
Buchheit and Laursen, 2013; Caputo and Denadai, 2004

HIIT Target systems	Example Formats
Aerobic	Short intervals
Aerobic +Neuromuscular	Short intervals + bodyweight jumps
Aerobic + Anaerobic	Long intervals
Aerobic + Anaerobic + Neuromuscular	Repeated sprint training
Neuromuscular	Sprint interval training

Sample plan for a long HIIT session:

Running based | 2 sets | 5-7 reps | 2.5 mins of work, 2 mins rest | intensity of 82% of VIFT.

Target goal: Aerobic + Anaerobic energy system focus.

Small sided game design – variables (Iacono, Eliakim and Meckel, 2015; Dello Iacono et al, 2018; Hill-Haas et al, 2011)

- Duration
- Length of the pitch - ↑ = ↑ Aerobic demand, inverse for smaller pitch
- Width of the pitch - ↑ = ↑ Anaerobic demand and change of directions.
- Area per player - ↑ = ↑ Aerobic + anaerobic + alactic demand, ↑ change of directions
- Number of players - ↑ = ↓ Aerobic demand, lesser players over
- bigger pitch size will ↑ metabolic demand
- Player deficits (3 vs 2) - ↑ = ↑ Metabolic demand (Aerobic + anaerobic + alactic system), ↑ change of direction.
- Time limit - ↓ = ↑ metabolic demand, ↑ linear running, ↓ change of direction.
- With and without goalkeepers ↑ = ↑ technical challenge
- Goal size ↑ = ↑ technical challenge
- Floating goals ↑ = ↑technical challenge

HIIT formats	Intensity	Rep duration/distance	Rest between reps	Reps	Sets
Short intervals	90-110% VIFT	15-45 seconds	15-90 seconds	8-12	2-3
Long intervals	77-88% VIFT	1-5 minutes	2-3 minutes	5-7	1-2
Repeated sprint training	All out sprint	10-30 metres	17-50 seconds	20-40	1-2
Sprint interval training	All out sprint	10-15 seconds	60-120 seconds	6-10	1-2

PHYSICAL PERFORMANCE DEVELOPMENT:

Agility



Agility is a combination of perception and change of direction. Proper technique is key to all things related to agility.

Change of direction occurs in three phases: deceleration (feet about to hit the ground), plant step (foot contact/repositioning), reacceleration (propulsion). To facilitate the common position for most change of direction movements, ask the athlete to stay low, and keep their arms close to their body.

To best develop agility, use actual game-based movements with added challenges such as:

Introducing greater variability (e.g. adding a defender to stop the athlete)

Technical models of agility: Plyo step, Crossover step, Drop step, Cutting

Perceptual models of agility: Visual scanning, Anticipation, Pattern recognition, Knowledge of situations

Burghelli et al 2008; Clarke et al 2018

Agility/Change of direction challenge

	Low	High	
Perceptual	Audio cue	Visual clue	Visual + Audio
No of changes of direction	1-2	2-4	>4
Constraints	Static block/player	Dynamic block/player	
Task	Pre-planned	Coach-led	Reactive pvp

PHYSICAL TRAINING LOAD MONITORING



External Training

Load:

Volume load (sets x reps x load)
Average intensity (Volume load/total session reps)
Reps in reserve
Velocity of movement (linear encoder)
[also used as an internal load monitoring tool]
Time-motion analysis
Number of contacts.

Internal Training

Load

Sessional rating of perceived exertion (Foster's 10 point scale) (sRPE) = RPE x Duration
Wellness questionnaires (e.g. POMS)
Differential RPE (dRPE)
Resting heart rate, submax heart rate, heart rate recovery, heart rate variability
Lactate threshold.
Neuromuscular efficiency (jumps)

HANDBALL SPECIFIC COMPLEX TEST



BRITISH
HANDBALL

- The HBCT (Figure 2) consists of four activity series (AS): agility parcours, defensive action, sprint (10 m, 20 m) and throw on goal parcours.
- The four AS are to be completed twice and containing five active pauses (four times for 15s, once 30s between the two rounds), which reflects the intermittent load character during the match. The 10 minutes follow-up is based on the duration of the half-time (15 min) and is used to measure the ability of recovery of in the athlete during this period.
- Before completing the HBCT, the handball player performs a warm-up (20 minutes) and the “throw on goal”-parcours (part 4 of the activity series) to compare throwing velocity and accuracy with and without pre-load.
- Measures: Technical errors, time, throwing velocity, heart rate, blood lactate, speed with/without the ball, anaerobic capacity, endurance, metabolic and cardiac recovery, handball specific skills under pressure

Source: The Handball-specific-complex-test, a tool for performance diagnostics and his benefits, Souhail Hermassi1 & René Schwesig2

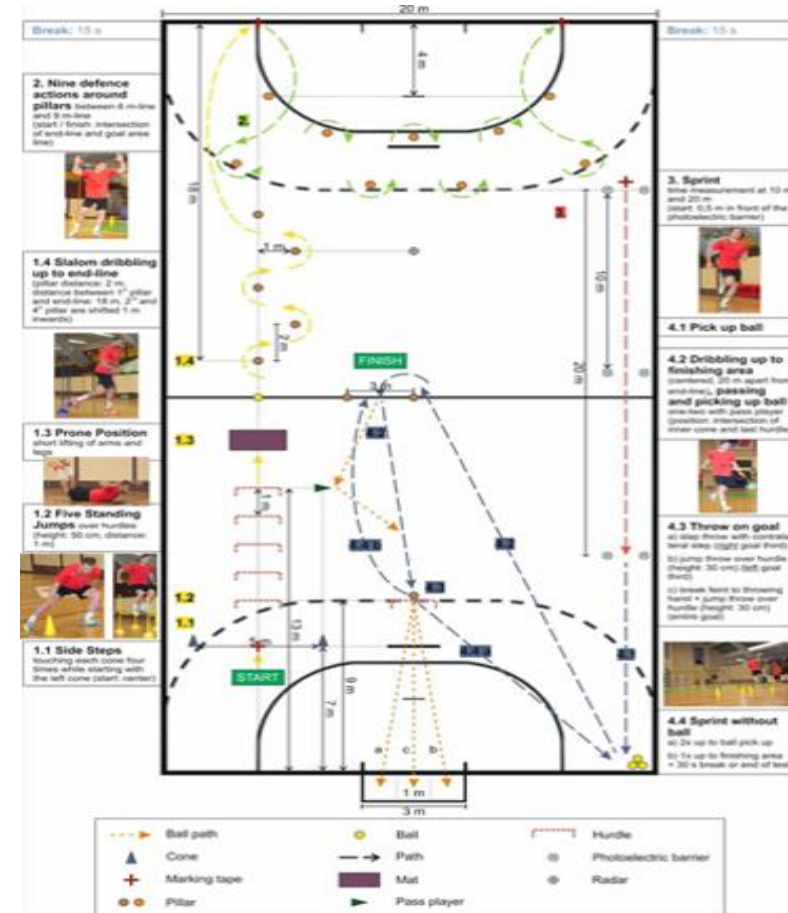


Fig. 2: Handball Specific Complex Test (HBCT) – test draft and test description.

HANDBALL SPECIFIC COMPLEX TEST: Warm-Up Example and Measurements



Action	Activity	Description
1. Agility Parcours	Side steps	between cones at 5m distance, touching each cone 4 times.
	Standing jumps	Free standing jumps over hurdles (50cm (H) 1m (D))
	Prone Position	Prone position sort lifting arms and legs
	Slalom dribbling	dribbling up to end line, 2m distance Distance between 1st and end line=18m. 2nd and 4th 1minwards
2. Defensive Actions		9 defensive actions around pillars between 6 and 9m lines. 90 degree angle in elbow and shoulder during action
3. Sprint		Without ball handling, measure at 10 and 20m
4. Throw on goal parcours	Pick up ball	Pick up ball at corner of side line and goal line x3
	Dribbling	Up to finishing end (centred, 20m apart from end line). Passing and picking up ball with pass player
	Throw on goal	1. Slap throw with contralateral step (target right goal 3rd) 2. Jump throw over hurdle (30cm)(target left goal 3rd) 3. Break feint to throwing hand, jump throw over hurdle(target entire goal)
	Sprint without ball	1. Up to ball pick up x2 2. Up to finishing area 30s between rounds or end of test

Measurement Systems:

- Time-photoelectric cells, placed at 0m, 10m and 20m
- Throwing speed-speed check radar gun
- Heart rate-real time monitoring system. Mean heart rate during 10mins of recovery
- Lactate-Blood lactate concentration sampled from players ear, before the test and 2, 6 and 10 minutes after the test. Using lactate analyser.

HANDBALL SPECIFIC COMPLEX TEST: Benchmark Research



Parameters	Round 1		Round 2		Differences (95%CI)	ANOVA		Effect size d
	Mean	95%CI	Mean	95%CI		P	η^2	
Heart rate after round (Min ⁻¹)	180	176-184	183	180-186	3.0 (0.75-4.40)	0.008	0.302	0.66
Agility (s)	27.7	26.8-28.5	30.4	29.5-31.3	2.8 (2.04-3.48)	<0.001	0.761	1.78
Defensive action (s)	16.3	15.9-16.16	17.1	16.7-17.4	0.8 (0.61-1.04)	<0.001	0.767	1.81
Sprint 10m (s)	1.99	1.94-2.04	2.11	2.05-2.17	0.12 (0.07-0.17)	<0.001	0.546	1.10
Sprint 20m (s)	3.47	3.39-3.56	3.74	3.63-3.85	0.27 (0.17-0.36)	<0.001	0.638	1.33
Overall throwing time (s)	46.2	44.2-48.2	47.2	45.3-49.0	1.0 (-0.39-2.28)	0.155	0.098	0.33
Overall time of all activities (s)	95.6	92.7-98.5	100.5	98.3-102.7	4.9 (3.46-6.37)	<0.001	0.712	1.57
Throwing speed first throw (kph ⁻¹)	86.9	82.5-91.3	82.6	78.5-86.7	4.3 (-0.26-8.84)	0.063	0.162	0.44
Throwing speed second throw (kph ⁻¹)	79.6	76.1-83.2	76.5	72.6-80.5	3.1 (-0.81-7.00)	0.114	0.120	0.37
Throwing speed third throw (kph ⁻¹)	79.0	74.7-83.2	73.3	69.0-77.7	5.7 (1.10-10.1)	0.017	0.252	0.58

Differences between means were considered statistically significant if P values were less than 0.05 and partial eta-squared (η^2) - values were higher than 0.10.

CI – confidence Intervals

Sample – 19 senior Bundesliga (male) top players.

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TRADITIONAL TESTING: Protocol and Benchmark Research



Day 1

- Body composition measurement of height, body mass, and skinfolds.
- Explosive muscle strength of the lower limbs using countermovement jump (CMJ) with hands on hips and jump-and-reach (JR) test with 3-step run up.
- Agility performance using the T-test, including forward-backward and sideways running ⁽¹⁾.

Day 2

- Maximum dynamic strength using 1 repetition maximum bench press ($1RM_{BP}$) and 1 repetition maximum back squat ($1RM_{BS}$).
- Yo-Yo intermittent recovery test, level 2 (YYIR2); 2 times 20 m including a quick turn, 10 seconds of recovery with increasing speed, and repeated until exhaustion ⁽¹⁰⁾.

	N	Pre	Post	%
Body weight (kg)	19	94.0 ± 6.6	95.5 ± 6.4‡	1.6
Body fat (%)	19	15.2 ± 2.8	14.4 ± 2.6‡	1.0
FFM (kg)	19	79.5 ± 5.7	81.7 ± 5.6	2.7
CMJ (m)	16	43.5 ± 4.2	45 ± 5.4	3.4
JR (m)	16	68.5 ± 5	69 ± 3.3	0.7
T-test (s)	15	8.38 ± 0.2	8.17 ± 0.2‡	2.5
$1RM_{BP}$ (kg)	10	110 ± 12.1	116 ± 15.5‡	5.4
$1RM_{BS}$ (kg)	4	156 ± 29.8	190 ± 34.6	22
YYIR2 (m)	16	797 ± 175	997 ± 167‡	25

Source: Strength and Conditioning Training by the Danish National Handball Team before an Olympic Tournament, Kvorning, Thue^{1,2}; Hansen, Mikkel R.B.; Jensen, Kurt
Journal of Strength and Conditioning Research: July 2017 - Volume 31 - Issue 7 - p 1759-1765
doi:10.1519/JSC.0000000000001927

*FFM = fat free mass; CMJ = counter-movement jump; JR = jump-and-reach; RM = repetition maximum; $1RM_{BP}$ = bench press; $1RM_{BS}$ = back squat; YYIR2 = Yo-Yo intermittent recovery test: level 2.

** Values for pre and post the 8-week training period are shown, Values are in mean ± SD.

‡ Significant difference ($p < 0.005$) between pre and post.

“The holistic professional approach to the Performance Pathway Blueprint demonstrates a meticulous attention to detail akin to development plans seen at the highest level of European handball.

The European Handball Federation is extremely impressed with the British Handball Association’s Performance Pathway Blueprint, which demonstrates a very clear and sophisticated understanding of the handball high performance pathway and what they need to achieve to reach the top level of the sport.

This initiative encompasses not only the necessary and important scientific methodology, it also embraces bespoke schemes for the key age groups based on comparable international figures and benchmarks. The British Handball Association Performance Pathway Blueprint validates the required competence to reach the upper echelon of the sport, and the European Handball Federation unreservedly supports this endeavour”.

Martin Hausleitner, Chief Operating Officer, European Handball Federation