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REPORT ABOUT BIO-BANDING: Implementation of bio-banding events in Poland

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1. Bio-banding events

After discussing initial concepts and implementing the bio-banding model in Prague in September 2025, several insights were gathered for conducting the bio-banding tournament in Poland. Detailed information will be provided in Deliverable 5.1 (Implementation Progress). The bio-banding events took place in Rzeszów in November 2025, following the establishment of contact with participants from local soccer clubs. **We obtained authorization from the participants, as well as from their parents and legal guardians, to collect and share their information as part of the project's reporting and dissemination efforts**. **For data management, the information was kept anonymous and can only be accessed by members involved in the project.**

2. Description of activities

2.1. Biological maturation assessment

After the recruitment was completed, two trained observers conducted the anthropometric measurements, including height and weight. Chronological age was calculated by subtracting the birthdate from the date of observation, and parents' heights were collected using their identification cards. The formula allows the indicator of biological maturation to group players according to percentage of predicted adult height (Figure 1). The data was introduced in an excel spreadsheet to calculate the percentage of predicted adult height (Figure 2).

Figure 1. Data collection to estimate biological maturity status.

lp	Nazwisko i imię	team	year of birth	measurement date	age	Current body height (cm)	Current body mass (kg)	mother's body height	father's body height	average body height of parents (cm)	predicted body height (cm)	APH
					12,3	164	47,9	165	185	175	189,5	86,5435
					12,2	170	60	162	180	171	188,5	90,1857
					12,4	147	34	169	173	171	177	83,0508
					12,1	138	30	156	185	170,5	171	80,7018
					12,1	140	30	156	185	170,5	172,7	81,0654
					12,6	153	48	155	178	166,5	175	87,4286
					12,7	154,4	45	162	182	172	179,9	85,8255
					12,5	156,00	49,7	172	184	178	184	84,7826
					12,9	148	43	164	180	172	175,8	84,1866
					12,0	153,00	37	164	172	168	179	85,4749
					11,1	148	38	160	186	173	182	81,3187
					12,6	142	30	160	178	169	171,3	82,8955
					12,4	155	40	170	185	177,5	185,8	83,423
					11,9	152	36	164	183	173,5	183,7	82,7436
					11,7	149	41	165	169	167	177	84,1808
					11,8	155	34	168	176	172	185,4	83,603
					12,2	162	47	167	185	176	189	85,7143
					12,7	170	50	174	185	179,5	191,5	88,7728
					12,7	158	45	158	182	170	180,7	87,4377
					12,7	173	62	170	195	182,5	191,6	90,2925
					13,1	181	78	165	188	176,5	194	93,299
					13,4	164	62	160	184	172	182,3	89,9616
					13,6	180	67	176	179	177,5	193	93,2642
					13,8	170	55	160	187	173,5	185,3	91,7431
					13,7	169	56	162	187	174,5	185,2	91,2527
					13,0	154	48	162	178	170	176	87,5
					13,8	172	78	170	175	172,5	184,3	93,3261
					13,0	158	45	177	192	184,5	187,8	84,1321
					13,8	165	50	180	180	180	186,6	88,4244
					13,1	164	45	164	179	171,5	183,3	89,4708
					13,3	166,6	50,5	164	184	174	186	89,5699
					13,8	180,7	64,7	176	194	185	198	91,2626
					13,8	160	47	157	174	165,5	175	91,4286
					13,6	170	50	170	190	180	189,6	89,6624
					13,6	165	56,5	162	176	169	179,4	91,9733
					13,1	167	56	172	178	175	186,4	89,5923
					13,6	154	57	156	169	162,5	169	91,1243
					12,9	154	55	175	185	180	182	84,6154
					13,7	165	52	170	173	171,5	181,3	91,0094
					13,0	153,5	50	166	183	174,5	179,2	85,6585

Figure 2. Data collection of soccer players. The last collum represents the indicator of biological maturation.

2.2. Application of age and bio-banding sessions

Four teams were recruited, consisting of players younger than 13 years old (under-13) and those aged 13.0 to 13.9 years (under-14). All the teams were certified by the Polish Football Federation. Both players compete into two different formats: chronological age groups and players grouped by biological maturity. The characteristics of both formats were:

- Game format: 7 vs. 7
- Surface: artificial grass
- Goal dimensions: 6 m × 2 m
- Ball size: 4
- Pitch dimension: 40 m × 28 m
- The teams were composed of 10 players, and each half was comprised of 20 minutes (total match time was 40 minutes)
- The interval was 7 minutes and the transition between different formats was 15 minutes

Before each match, a standardized warm-up was conducted by a certified coach, utilizing parts 1 and 3 of the FIFA11+ protocol. Three bands are theoretically available for the implementation of bio-banding protocols:

- Players at 80% – 85% of Predicted Adult Height
- Players at 85% – 90% of Predicted Adult Height
- Players at 90% – 95% of Predicted Adult Height

Most of the players in the current sample are within the **second and third band**.

2.3. Assessments

During the matches, assessments were conducted to compare the effects of different game formats on various variables. Two tools were utilized: an accelerometer, a heart rate monitor, and a global positioning system, as illustrated in Figures 3 and 4.

Figure 3. Football match (bio-banding format) using devices for the assessment.

Figure 4. Football match (chronological age format) using devices for the assessment.

At the end of the match, players rated their perceived exertion after both formats. The scale consists of ten different levels of intensity, as shown in Figure 5.

Figure 5. Rate of perceived exertion assigned after the implementation of bio-banding tournament.

Finally, a presential survey and focus-group were conducted after the models have been implemented (the material used is presented in attachment of this file).

2.3. Variables collected

Different variables were recorded:

- Maximal heart rate
- Average heart rate
- Calories
- Percentage of time at light intensity
- Percentage of time at moderate intensity
- Percentage of time at vigorous intensity
- Percentage of time at moderate-to-vigorous activity
- Steps count
- Steps per minute
- Qualitative information

3. Main results

In terms of the main results of the project, participants in the bio-banding tournament exhibited both lower maximum and average heart rates compared to those in chronological age groups. Additionally, no significant differences were observed in the other physical variables among the groups. More importantly, the perceptions of athletes are extremely positive about the bio-banding formats. Below, we present some examples of reactions from athletes who participated in bio-banding tournaments:

> "I moved from the younger group to the older one, and I have to say the game was tougher and more demanding for me, but I actually enjoyed playing much more." (Athlete A)

> ""I went from the older group to the younger one, and it was easier for me. I had more time to make decisions and think during the game." (Athlete B)

> "I moved to the younger group and felt a big physical advantage. The game was easier for me because of that." (Athlete C)

> "I switched to the older team, and I'm really happy I got the chance to play with them. The intensity was definitely higher — quicker passes and a lot more movement." (Athlete D)

4. Conclusion

The meetings in Coimbra, Prague, and Rzeszów provided valuable opportunities for partners to share perspectives and develop crucial insights into the implementation of bio-banding tournaments. Bio-banding is an innovative approach that involves grouping athletes based on their biological maturity rather than chronological age, aiming to create fairer competition environments.

- **Coimbra Meeting**: This gathering allowed partners to discuss the theoretical frameworks and practical applications of bio-banding. They explored case studies, shared research findings, and examined the physiological differences among young athletes at varying maturity levels.
- **Prague Meeting:** Here, the focus shifted to logistical aspects of organizing bio-banding tournaments. Partners discussed how to effectively implement bio-banding in various sports, addressing challenges such as athlete assessment methods, data collection, and managing competition schedules.
- **Rzeszów Meeting:** The final meeting concentrated on feedback from initial bio-banding tournaments. Participants analyzed results and experiences, offering insights into the reception of this approach among athletes and coaches. They also identified areas for improvement and strategies to optimize participant engagement and performance.

Overall, these meetings fostered collaboration and designed a framework for the successful integration of bio-banding in sports, ultimately aiming to enhance fairness and athlete development.

5. Attachment

Bio banding Competition Focus Groups

A total of four 20 minute focus groups will be conducted to players' perceptions of the advantages and disadvantages of bio banded competition. Two of the focus groups will consist of players who are competing against players who are chronologically older but of the same maturation status (playing up group). The other two focus groups will contain players who are competing against players who are chronologically younger than themselves but of a similar maturation status Playing down group). Each of the focus groups will include a player from each of different teams. Each team will be asked to identify a player who matches the member characteristics and should ideally benefit the most from a biobanding strategy. Each focus group will be led by a trained researcher and be recorded for transcribing.

The purpose of today's competition is to match players on the basis of how biologically mature them and not just their chronological age. Obviously some players mature faster than other players of the same age, whereas some players are quite delayed in their maturation.

As players who have been have been asked to compete against players who are older, but not necessarily more mature, we would like to learn what you liked and did not like about today's competition.

Process

1. Boys interviewed in groups of 4. Ideally interview early developers playing up together, and later developers playing down together.
2. Explain to boys the purpose of the interview and that they are the experts and that you are looking for feedback on today's experiences and what was good or bad.
3. Ask them to think about their experience today and think about how it differed (or not) from their experiences playing in age group competitions. #
4. Ask them in the next 3-5 mins to just jot down on a pad of paper some key things that they thought were good or bad.
5. When they are done ask the players to start with what was good. One player will offer something. Ask them to explain it or give an example. Ask other kids if they put the same thing down and to explain.
6. Continue until you exhaust the positives (if there are any) and then repeat process with negatives.
7. At the end reiterate the fact that they are the experts in this area and that the club values their opinion. Ask them each individual for their recommendation as to whether or not the club should continue to integrate/ include such games into their existing games programme and if so/or not, then why. Obviously not as a replacement for age group games but as an adjunct.
8. Complete process and thank boys for participation and valuable feedback.