ALPHA FITNESS COMPARATIVE STUDY

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ACTIVYOU

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INTRODUCTION

In the context of this report, a study of physical fitness in adolescents will be conducted, focusing on the assessment of values obtained through four fundamental tests. The primary objective of this research is to analyse and compare fitness levels between different demographic groups, specifically focusing on differences between genders (boys and girls) and between different sporting environments (clubs and schools).

Assessing physical fitness through such standardised tests will not only allow us to better understand the physical fitness of adolescents, but also to identify possible disparities between demographic groups and sporting environments.

These tests have been carried out in different contexts, three educational centres, Liceo la Paz in Coruña (Spain), Os Nikolak Velimirovic in Sabac (Serbia), a football sports club in Coruña (Spain) and a youth basketball association in Prerov (Czech Republic). In all of them, the participants who have taken the tests are teenagers between 13 and 16 years of age.

As for the participants who have passed the tests, they are: Innosport, through its football club 80 participants Czech Youth Association z.s, through its youth basketball association 40 participants and through its basic school group another 35.

Liceo La Paz (has carried out the tests to a higher number than agreed, in order to involve all the lines of the school) 232 participants.

Os Nikolak Velimirovic 100 students from his school.

The four tests that will form the core of our analysis are as follows:

• Aerobic Capacity: Assessed by the 20-metre out-and-back test, also known as the Coursse Navette. This test provides a measure of subjects' cardiovascular endurance and lung capacity.

• Maximum Upper Body Strength: To be assessed by manual grip strength, expressed in kilograms. This test is indicative of upper body muscular strength and endurance.

• Lower Body Explosive Strength: Measured by the long jump with feet together in centimetres. This test will give an idea of the power and explosiveness of the leg muscles.

• Speed/Agility: This will be assessed by the time in seconds required to complete a 4x10 metre run. This test will allow us to analyse the speed and the ability to change direction of the subjects.

During the analysis of the results of these tests, we will focus on categorising fitness levels based on predefined standards, establishing categories ranging from "Very Low" to "Very High".

These standards, which are enclosed, are taken from the standard measurements made by Europe through the AlphaFitness battery measurement.

Aerobic capacity: 20 meter shuttle test

Boys

	Very Low	Low	Medium	High	Very High
13	≤3,0	3,5 - 4,5	5,0 - 6,0	6,5 - 7,5	≥8,0
14	≤3,5	4,0 - 5,5	6,0 - 6,5	7,0 - 8,5	≥9,0
15	≤4,0	4,5 - 5,5	6,0 - 7,0	7,5 - 8,5	≥9,0
16	≤4,0	4,5, - 5,5	6,0 - 7,0	7,5 - 8,5	≥9,0

Girls

	Very Low	Low	Medium	High	Very High
13	≤2,0	2,5 - 2,5	3,0 - 3,5	4,0 - 4,5	≥5,0
14	≤2,0	2,5 - 3,0	3,5 - 4,0	4,5 - 5,0	≥5,5
15	≤2,0	2,5 - 3,0	3,5 - 4,0	4,5 - 5,0	≥5,5
16	≤2,0	2,5 - 3,0	3,5 – 4,0	4,5 - 5,0	≥5,5

Maximum upper body strength: hand grip strength (kg)

Boys

	Very Low	Low	Medium	High	Very High
13	≤ 21,4	21,5 - 24,7	24,8 - 27,8	27,9 - 31,8	≥ 31,9
14	≤ 26,3	26,4 - 30,4	30,5 - 34,0	34,1 - 38,5	≥ 38,6
15	≤ 31,3	31,4 - 35,7	35,8 - 39,7	39,8 - 44,3	≥ 44,4
16	≤ 35,9	36,0 - 40,0	40,1 - 43,7	43,8 - 48,1	≥ 48,2

Girls

	Very Low	Low	Medium	High	Very High
13	≤ 19,9	20,0- 22,5	22,6 - 24,8	24,9 - 27,6	≥ 27,7
14	≤ 21,5	21,6 - 24,1	24,2 - 26,4	26,5 - 29,2	≥ 29,3
15	≤ 22,5	22,6 - 25,1	25,2 - 27,4	27,5 - 30,3	≥ 30,4
16	≤ 22,9	23,0 - 25,4	25,5 - 27,8	27,9 - 30,8	≥ 30,9

Explosive strength of the lower body: long jump to feet together (cm)

Boys

	Very Low	Low	Medium	High	Very High
13	≤ 135	136 - 152	153 - 167	168 - 184	≥ 185
14	≤ 151	152 - 169	170 - 183	184 - 200	≥ 201
15	≤ 165	166 - 182	183 - 196	197 - 212	≥ 213
16	≤ 175	176 - 192	193 - 206	207 - 221	≥ 222

Girls

	Very Low	Low	Medium	High	Very High
13	≤ 118	119 - 133	134 - 147	148 - 163	≥ 164
14	≤ 121	122 - 137	138 - 151	152 - 167	≥ 168
15	≤ 123	124 - 138	139 - 151	152 - 167	≥ 168
16	≤ 126	127 - 141	142 - 154	155 - 169	≥ 170

Speed/agility: 4x10m (sec)

Boys

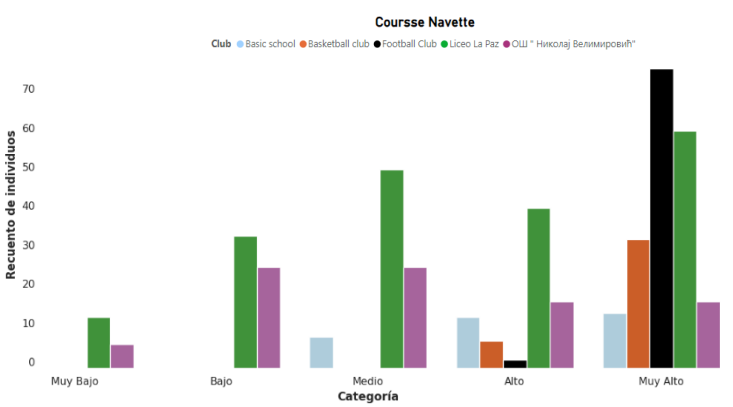
	Very Low	Low	Medium	High	Very High
13	≥ 13,0	12,3 -12,9	11,8 - 12,2	11,2 - 11,7	≤ 11,1
14	≥ 12,6	11,9 - 12,5	11,4 - 11,8	10,9 - 11,3	≤ 10,8
15	≥ 12,1	11,5 - 12,0	11,0 - 11,4	10,5 - 10,9	≤ 10,4
16	≥ 11,8	11,1 - 11,7	10,7 - 11,0	10,2 - 10,6	≤ 10,1

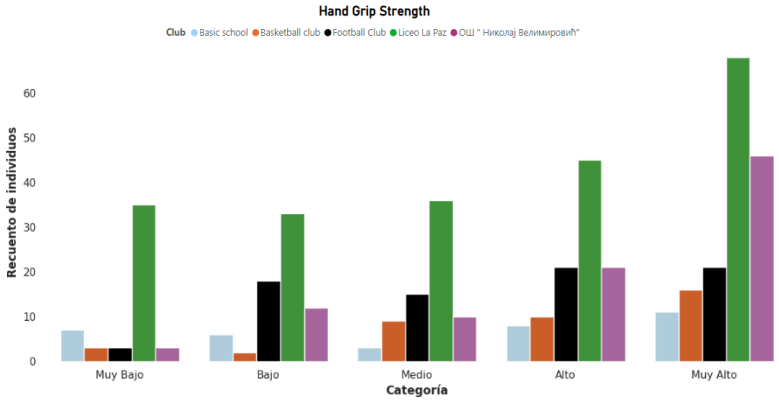
Girls

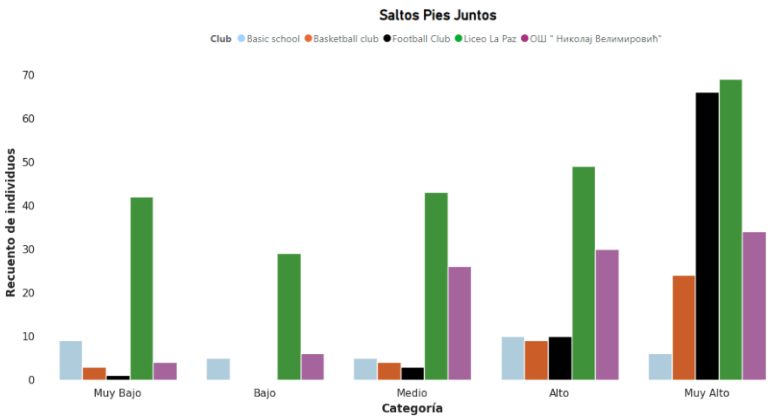
	Very Low	Low	Medium	High	Very High
13	≥ 13,9	13,1 - 13,8	12,5 - 13,0	11,9 - 12,4	≤ 11,8
14	≥ 13,8	13,0 - 13,7	12,4 - 12,9	11,8 - 12,3	≤ 11,7
15	≥ 13,7	13,0 - 13,6	12,4 - 12,9	11,8 - 12,3	≤ 11,7
16	≥ 13,6	12,9 - 13,5	12,3 - 12,8	11,7 - 12,2	≤ 11,6

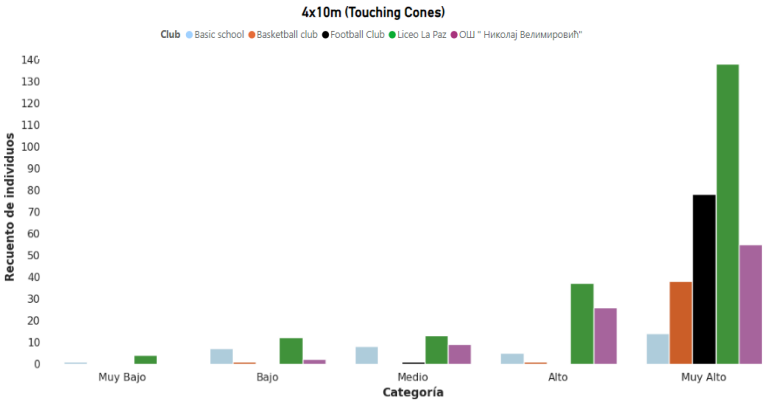
SCHOOL COMPARISON

In this first section, we will make a comparative study of the different schools. The following image shows the distribution of each of the categories for each school with respect to each of the tests carried out:









Coursse Navette

- **Football Club** shows a significant number of individuals in the **“Very High”** category, though with less representation in the middle tiers.
- Liceo La Paz also show presence in the “Very High” category but also has a strong presence in “Medium” and “High”, suggesting that the majority of its students possess above-average endurance. This may reflect a well-developed conditioning program that emphasizes cardiovascular fitness.
- **Basketball club** and **Basic school** display a more balanced distribution, but with fewer individuals in the top categories.
- The Serbian school 'ОШ "Николај Велимировић"' shows a more diverse profile, with individuals spread across **"Very Low"**, **"Medium"**, and **"Very High"**, suggesting a wide range of aerobic fitness levels.

This analysis reveals that Football Club demonstrates outstanding aerobic conditioning across the board. The high percentage of students in "Very High" indicates systemic emphasis on endurance. Liceo follows closely behind. Schools with flatter distributions may benefit from more consistent cardiovascular training across their population.

Hand Grip Strength

- The clear lead by Liceo La Paz in the upper strength categories implies structured strength development, possibly supported by resistance training or specific sport programs.
- ‘ОШ "Николај Велимировић"’s strong performance also points to an environment that supports upper body conditioning, albeit possibly with slightly more variability.
- Football Club and Basketball club show moderate results, suggesting that while upper body strength is present, it's likely not a key training priority.
- Basic school again shows lower concentration in top categories, possibly reflecting limited access to structured physical training facilities.

This analysis highlights stark differences in **upper-body development** across institutions. Liceo La Paz has likely incorporated resistance training into its program. Meanwhile, clubs with flatter results could improve by incorporating targeted strength work.

Long Jump

- Liceo La Paz again dominates, showing that explosive power in the lower body is also a strength of this institution — this often correlates with performance in jumping sports or general athleticism.
- Football Club again shows a concentrated presence in “High” and “Very High”, indicating an emphasis on leg strength and motor control.
- ОШ ‘Николај Велимировић’ has consistent but not leading results — possibly due to a greater focus on agility and endurance over raw explosiveness.
- Basketball club and Basic school remain largely distributed in middle and low categories.

The results from this year’s long jump test reaffirm the strong performance of Liceo La Paz and ОШ “Николај Велимировић”, both of which continue to demonstrate a clear focus on developing explosive lower-body power. Their students dominate the “High” and “Very High” categories, confirming the effectiveness of their physical training programmes, likely involving jumping mechanics, plyometrics, and leg strength conditioning.

4x10m (Touching Cones)

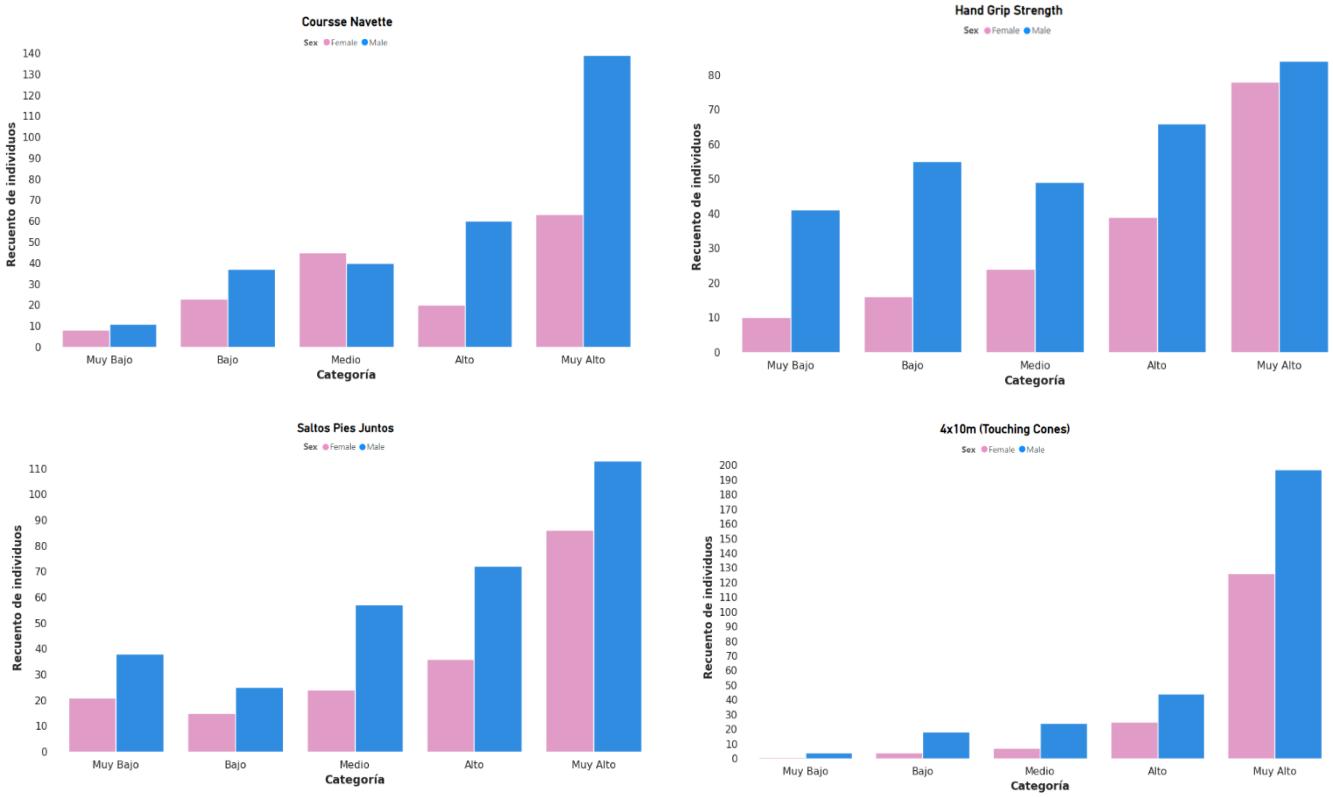
- The extreme concentration in “Very High” for Liceo La Paz is particularly noteworthy. This suggests that nearly all participants from this school are exceptional in speed and directional change, which are key traits in competitive sports.
- Football Club and ‘ОШ "Николај Велимировић"’ also display strong performance, aligning with expectations for institutions involved in field sports.
- Basic school and Basketball club show a lower number of participants but still manage a presence in "Very High", suggesting that even without intensive training, natural ability or basic conditioning may be helping a few individuals stand out.

In this test, there is a remarkable dominance by Liceo La Paz in the “Very High” category, with nearly all their students achieving top-tier scores. This suggests systematic training in speed and agility, most likely through high-frequency drills that improve acceleration, deceleration, and directional change.

Football Club and ОШ “Николај Велимировић” also perform strongly, reinforcing the trend that sports-focused institutions consistently outperform general schools in short-duration, high-intensity activities. This difference likely stems from their greater emphasis on sport-specific drills and structured training environments.

Meanwhile, Basic School and Basketball Club continue to show a wider spread of performance across all categories, with relatively fewer participants in the “Very High” range. This suggests more variability in physical preparation, possibly due to irregular or less focused training sessions.

GENDER COMPARISON



Analysing these images, we can draw the following conclusions for each test:

Coursse Navette

- Boys clearly outperform girls in the higher categories, particularly in the “Very High” category, where their presence is substantially greater. This suggests that, in this aerobic endurance test, men tend to perform better at the more demanding levels.
- Girls, while present in the top levels, have a more dispersed distribution. There is a notable presence in “Very High” and “Medium”, which points to greater variability and generally lower aerobic fitness among females.

In the Course Navette test, men tend to perform better in the higher categories, which could be attributed to physiological differences and/or training levels. However, they also show greater variability in their results. Women, on the other hand, show a more consistent performance, although with less representation at the higher levels.

Hand Grip Strength

- The male population shows a strong concentration in the upper performance tiers, especially in “High” and “Very High”, suggesting more advanced development of muscular strength in the upper body.

- Female participants Show presence in the “Very Low”, “Low”, and “Medium” categories, although a meaningful number still reach the “Very High” tier, indicating that while the average is lower, individual high performers exist.

In the Hand Grip Strength test, men significantly excel in the higher categories, consolidating their position as the group with the highest grip strength. Women have a similar behavior in the graph, being present in both low and high ranges.

Jumping Feet Together

- In this case, the male gender is higher in the ‘High’ and ‘Very High’ categories, showing a greater number of individuals in these areas, especially in the latter, where the difference with the female gender is more notable. On the other hand, females show a more uniform behaviour, with a more balanced distribution in all categories.

A greater regularity is observed for females in terms of proportion in the different categories. However, the best records continue to be obtained by men, who dominate the higher categories. In both cases, the initial situation reflects potential, and it is recommended to continue promoting physical activity improvement plans, seeking not only to increase the strength of the lower body, but also to encourage a comprehensive improvement in the coordination and harmony of physical development between the different segments of the body, thus promoting a balanced and healthy physical development in young people of this age group.

4x10m (Touching Cones)

- Among all tests, this one reveals the most significant performance gap between boys and girls. Boys dominate the “Very High” category with an overwhelming lead, and they are also strongly present in the “High” tier.

- Girls appear much more frequently in the lower half of the distribution, with a particularly high count in the “Very Low” and “Low” categories, indicating a lower average in terms of agility and sprint ability.

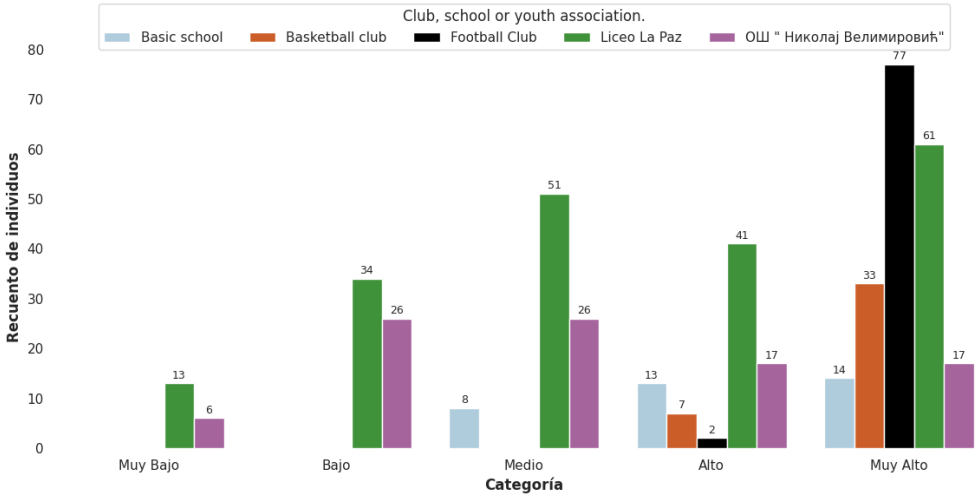
- This difference may reflect not just physical attributes like muscle fiber type and reaction time, but also a lack of exposure to high-intensity, speed-based training in girls' routines.

Females show a more uniform trend, with a relatively consistent distribution between the medium and high categories. Males, on the other hand, stand out for their superiority in the highest category, reflecting exceptional performance in the best records. Both groups have a solid base, and it is recommended that further work be done on improvement programmes that promote agility and speed. This will not only enhance performance in this specific event, but will also contribute to the holistic and balanced physical development of young people at this stage of development.

FINAL RESULTS ON HEALTHY PHYSICAL CONDITION

The results of the AlphaFitness battery evaluation were very diverse among adolescents aged 12 to 15 years. Significant variations were observed in all tests, both within each age group and between different physical activity context groups.

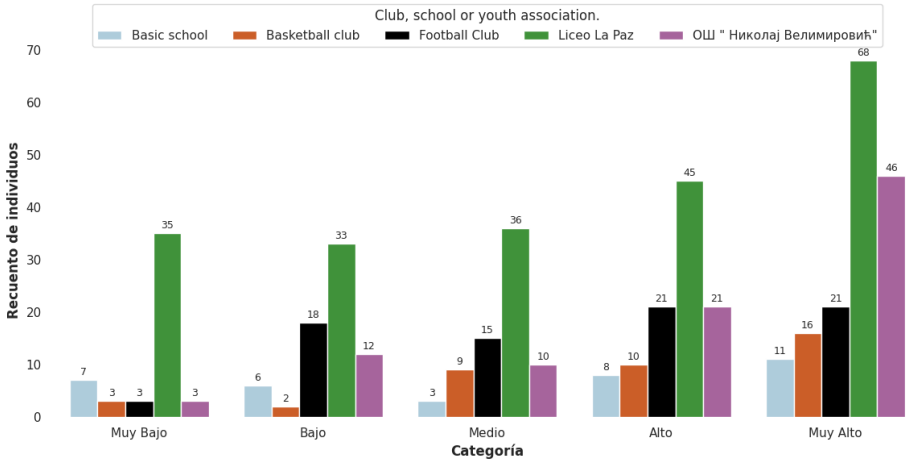
Regarding cardiovascular resistance



A notable distinction emerges between sports clubs and educational institutions. Football Club shows the strongest results, with 77 individuals in the "Very High" category, followed closely by Liceo La Paz with 61. In contrast, academic institutions like Basic School and ОШ "Николај Велимировић" have a broader distribution across all categories, including a noticeable presence in "Very Low" and "Low". These disparities reflect differences in emphasis on upper body strength training—particularly the systematic development of muscular endurance and power often found in more athletic settings.

Clubs with greater emphasis on resistance and strength training, such as Football Club and Basketball Club (33 individuals in "Very High"), excel in this test. Their training regimens likely incorporate consistent grip and upper body development, resulting in a stronger performance profile. Conversely, institutions without a dedicated physical conditioning program exhibit a more dispersed and less competitive distribution of results, underscoring the importance of progressive overload and training volume in muscular development.

In relation to muscle strength



The results of the hand grip strength test exhibit clear distinctions in muscular development across clubs and educational institutions. Liceo La Paz emerges as the dominant group, with high frequencies in both the “High” and “Very High” categories. This consistent performance across the upper tiers reflects a strong emphasis on physical conditioning and structured strength development within their program, likely due to either rigorous physical education or extracurricular training opportunities.

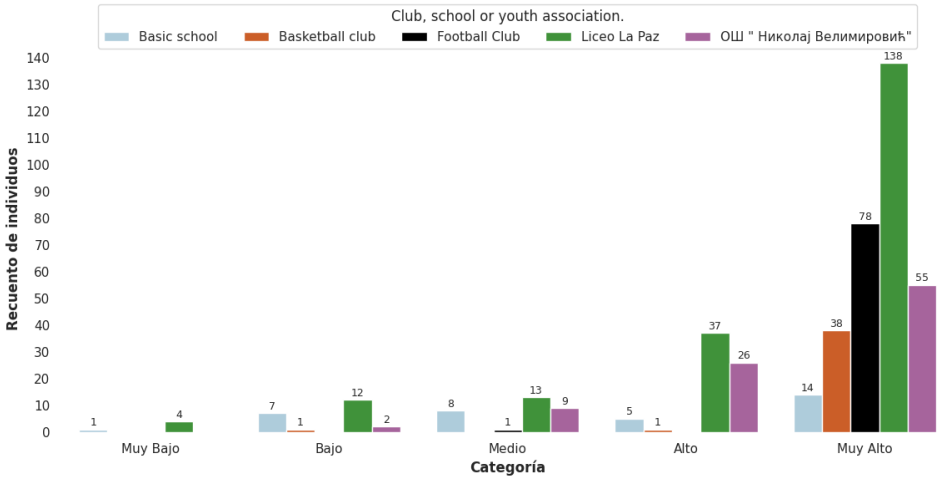
Following closely is ОШ "Николај Велимировић", which also demonstrates a substantial presence in the “Very High” category. The distribution of their participants indicates effective engagement with physical strength training, likely aided by recent improvements in program structure or increased student participation in physical activities. This performance shows a clear progression from the previous year, where their results were more modest in this domain.

The Football Club continues to show a well-rounded distribution, with a strong core in the “High” and “Very High” categories, though not surpassing the levels of the leading schools. This balance is consistent with the physical demands of football, which requires muscular strength alongside endurance and agility. However, the absence of extreme peaks may point to a broader but slightly less specialized training approach in terms of upper body strength.

Meanwhile, the Basketball Club displays a limited presence across all categories. Its modest representation in the “Very High” and “High” groups suggests that hand grip strength may not be a primary focus in their training regimen, which typically emphasizes mobility, coordination, and vertical explosiveness. Similarly, the Basic School shows a somewhat even but unremarkable distribution, with fewer individuals reaching the uppermost levels. This reflects a likely lack of targeted strength training and highlights the opportunity to enhance muscular development through more specific interventions in school settings.

Overall, the hand grip strength results underline the disparity between institutions with specialized training and those with general or minimal programming. Clubs and schools that incorporate resistance training and muscle development activities demonstrate superior outcomes

Regarding the measurement of Speed-Agility



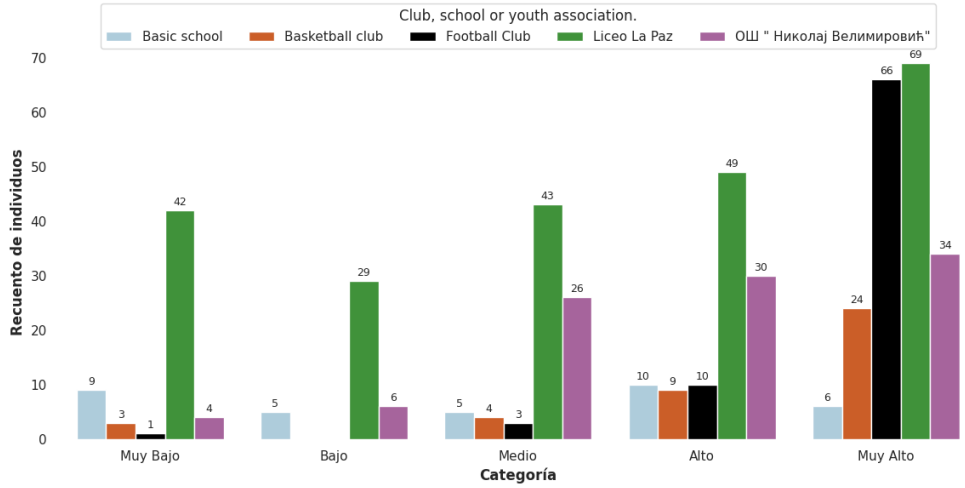
- The chart highlights substantial disparities in agility performance across different institutions. Liceo La Paz stands out with an overwhelming number of students (138) in the "Very High" category, far surpassing other entities. Football Club (78) and ОШ "Николај Велимировић" (55) also demonstrate strong performance, especially in the highest category. In contrast, Basic School and Basketball Club exhibit much lower representation at the top, suggesting that students in those environments may not benefit from equally intensive or structured training in speed and agility. These differences likely stem from disparities in coaching resources, training frequency, and program specificity.

- Institutions such as Liceo La Paz and Football Club, where students are presumably exposed to frequent, sport-specific drills, dominate the "Very High" and "High" bands. This aligns with the idea that experience, exposure to structured movement patterns, and consistent physical conditioning translate directly to superior test outcomes. On the other hand, schools like Basic School, with more diverse and general student populations, show a wider distribution and fewer individuals in top categories, underlining the importance of specialized athletic preparation.

- Clubs that integrate technique-focused training, particularly in sprint mechanics and multidirectional movement, achieve the highest performance in this test. Liceo La Paz’s dominance may reflect a well-established biomechanical training foundation, where change-of-direction speed, foot placement, and acceleration efficiency are actively taught. This gives their students a substantial edge over peers who may rely solely on natural ability without refined movement technique.

The data reflects that sports-focused organizations significantly outperform academic institutions in agility tasks like the 4x10m shuttle test. Incorporating structured speed and agility programs and emphasizing proper running technique across all clubs and schools could help narrow the performance gap. Ultimately, the findings validate the importance of dedicated movement training in developing well-rounded, agile young athletes.

Regarding the measurement of lower body strength through jumping



The results show clear distinctions between sports-oriented and educational institutions. Liceo La Paz leads with an outstanding number of students in the upper performance categories, particularly with 49 in "High" and 69 in "Very High". This suggests a strong emphasis on overall muscular strength in their training approach. ОШ "Николај Велимировић" follows closely with solid numbers, including 30 in "High" and 34 in "Very High", indicating consistent development of upper body strength.

The Football Club exhibits an exceptional spike at the top, with 66 individuals categorized as "Very High", suggesting a high-performance environment where grip strength, often linked to overall athletic capacity, is well-developed. This could be reflective of structured gym-based training or sport-specific strength conditioning, commonly found in football programs.

Educational institutions such as Basic School and Basketball Club show more diverse performance, with presence across all categories but a lower count in the top ranges. For instance, Basic School shows 10 individuals in "High" and only 6 in "Very High", while the Basketball Club shows 9 and 24 respectively. This reflects limited but improving strength development, perhaps due to more general physical education programs without targeted strength sessions.

Last conclusions:

The present analysis reinforces the significant variability in physical fitness levels among adolescents, influenced by key factors such as sex, age, and the type of institution or sports club in which they are enrolled. The visualized data across the four AlphaFitness battery tests—4x10m Shuttle Run, Hand Grip Strength, Standing Long Jump, and Course Navette—reveal consistent patterns in which structured sports environments, particularly Football Clubs and Liceo La Paz, demonstrate superior physical performance in most categories.

Significant sex-based differences were also observed, with males generally outperforming females in high-intensity tests, especially in strength- and agility-related assessments. Nonetheless, female participants also displayed a strong distribution in higher performance categories in several tests, suggesting the importance of tailored and inclusive training approaches that consider gender-specific development.

The comparative performance between clubs and schools highlights the impact of consistent and focused physical training. While sports clubs tend to produce a higher proportion of individuals in the "Very High" category across tests, educational institutions showed greater dispersion, underlining the need for more structured and regular physical education programs within schools.

These findings emphasize the continued relevance and necessity of implementing holistic physical activity programs that not only foster athletic performance but also support long-term health outcomes. Projects like ACTIVYOU, embedded within the ACTIVE LIFE HEALTHY framework, remain crucial for bridging these disparities by promoting engagement through inclusive, accessible, and developmentally appropriate physical activities.

Looking ahead, the planned expansion of the project through future studies will be essential to evaluate the longitudinal impact of these interventions. Continued research will allow for a deeper understanding of how contextual, biological, and behavioral factors intersect in adolescent fitness development. This will help refine and personalize training strategies, ensuring sustainable improvements in physical competence, health, and well-being among youth populations.

Year-to-Year Comparison: Evolving Trends in Adolescent Physical Fitness

The comparative analysis between the AlphaFitness test results from the previous year and the current evaluation cycle reveals several notable trends, improvements, and shifts in performance across both schools and clubs. These differences provide valuable insight into the ongoing development of physical fitness among adolescents and the influence of training environments.

Coursse Navette (Cardiorespiratory Endurance)

Shift in Institutional Leadership: While last year Football Club dominated the “Very High” category, this year Liceo La Paz significantly increased its representation in the top levels, showing a marked improvement in aerobic capacity. This suggests a greater emphasis on endurance training within this group.

Reduced Gap Between Schools and Clubs: Previously, sports clubs generally outperformed schools in this test. However, this year, schools like ОШ "Николај Велимировић" and Liceo La Paz demonstrated considerable improvements, reducing the gap with sports clubs.

Gender Distribution: Compared to the prior year, males continue to lead in the higher categories, but this year shows an increase in female participation in both “High” and “Very High” categories, indicating better overall conditioning in girls.

Hand Grip Strength

Performance Consolidation: Liceo La Paz remained dominant across categories, replicating last year’s outstanding performance. ОШ "Николај Велимировић" maintained its strong presence in the “Very High” category.

Improved Balance in Clubs: Unlike the previous year where clubs like the Basketball Club underperformed, this year all institutions, including Football and Basketball clubs, show better distribution across the middle and high categories, reflecting possible inclusion of more comprehensive strength training routines.

Gender Progression: Males still occupy the top categories, but females displayed a slight increase in the “High” category, reducing the previous gender disparity.

Standing Long Jump (Lower Body Strength)

More Uniform Distribution Among Clubs: While last year Liceo La Paz dominated with little competition, this year Football Club and Basketball Club also showed strong representation in the “Very High” category, suggesting focused improvements in explosiveness and jumping technique.

Female Advancement: The previous year showed a substantial gender gap. This year, females improved their presence in the “High” category, though males still lead the top levels. The distribution among girls is more balanced than in 2023, indicating broader development of power across the group.

4x10m (Agility and Speed)

Increased Specialization: Compared to last year, Football Club and Basketball Club have further consolidated their superiority in the “Very High” category, confirming the positive effect of targeted agility drills in structured sport settings.

Reduced Variability in Schools: Previously, Liceo La Paz and ОШ "Николај Велимировић" displayed wide dispersion across all categories. This year, their results are more concentrated in “High” and “Very High,” suggesting that training routines may have become more consistent or better targeted.

Notable Female Performance: Unlike 2023, where males largely outperformed in agility, females have increased their presence in “High” and “Very High” categories, showing improved responsiveness, coordination, and speed.

Key Differences Identified

General Improvement in School-Based Participants: Across nearly all tests, schools have shown greater presence in higher performance categories than the previous year. This may reflect increased awareness or implementation of physical training programs.

Reduced Gender Gaps: While males continue to dominate in strength and power categories, females showed improvements in aerobic endurance, agility, and even grip strength—suggesting a narrowing gap in physical performance between genders.

Club Consistency and Specialization: Clubs, particularly Football Club and Basketball Club, have maintained or strengthened their superiority in speed and agility-focused tests, validating the efficiency of sport-specific training.

Higher Uniformity in Distributions: Unlike the wider dispersion seen last year, this year's data indicates more homogeneity within institutions, with fewer outliers in lower categories and greater clustering in the upper performance ranges.

These evolving trends reinforce the positive trajectory of adolescent fitness development across both structured and educational contexts. Moreover, they validate the continued impact of the ACTIVYOU project and the potential for scaling training interventions to further equalize performance across groups.

LICEO LA PAZ

CZECH YOUTH ASSOCIATION

INNOdxt