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Change in Physical Fitness due to the COVID-19 Pandemic Lockdown in French Adolescents: A comparison between two independent large samples from Diagnoform battery.

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Background: Numerous studies reported a significant decline in physical activity level in adolescents as a result of the COVID-19 lockdown. Physical fitness is recognized as a powerful marker of health in youth. The aim of this study was to evaluate the impact of the COVID-19 Pandemic Lockdown on health-related physical fitness in French adolescents.

Methods: Two cross-sectional studies were performed comparing two different groups of French adolescents, before (sample 1) and after the first lockdown (sample 2). A total of 1231 adolescents (aged to 16.5 ± 1.5 years) participated in the two cross-sectional studies. Complete data for physical fitness and anthropometrics data were obtained.

21 **Results:** Adolescents from sample 2 showed lower physical fitness levels compared to adolescents from sample
22 1. Regarding physical fitness for boys and girls, physical fitness levels were significantly lower in both sex
23 between adolescents from the sample 1 and adolescents from the sample 2, except for cardiorespiratory fitness
24 and flexibility for boys and girls, respectively. The Physical fitness global score were also significantly lower
25 between adolescents from the sample 1 and 2 for boys (-9.8%, $p < 0.01$) and girls (-16.2%; $p < 0.01$), respectively.
26 Overall, the higher difference was found for performance in the speed body displacement test (-30%). A
27 difference of 12.8% and 25% were observed for boys and girls, respectively.

Conclusions: COVID-19- Pandemic Lockdown had a negative impact on physical fitness in French youth. This study highlight the need to develop, in a near future, prevention programmes in order to improve the physical fitness in youth.

28 **Keywords:** Health crisis, youth, Health.

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35 INTRODUCTION

36 Physical fitness is now widely recognized as a powerful marker of health in children and adolescents [1]. Health-
37 related physical fitness refers to the ability of your body systems to work together efficiently to allow you to be
38 healthy and perform activities of daily living [2]. Health-related physical fitness includes several components
39 such as cardiorespiratory fitness (CRF), musculoskeletal fitness (including muscular strength and endurance,
40 flexibility) and motor fitness [3]. In addition, body composition may be also included in health-related physical
41 fitness components [3]. Health-related physical fitness is associated to multiple health benefits, such as a low
42 risk to develop chronic diseases and premature death [1]. Recently, two systematic reviews and meta-analysis
43 showed the evidence linking both CRF and muscular strength in children and adolescents with the health status
44 later in life [4-5]. Authors showed that low muscular strength and CRF in adolescence are strongly associated
45 with risk factors for major causes of death in adulthood [4-5]. As shown in these two systematic reviews, CRF is
46 the most studied with strong evidence on health-related associations. A need to assess regularly this component
47 in youth is well established and underlined by the American heart Association [6].

48 In December 2019, a beginning a global pandemic emerged following an abnormal increase of viral pneumonia
49 in Wuhan. In March 2020, the World health Organization (WHO) announced a novel disease named Covid-19,
50 which is caused by the SARS-CoV-2 virus and became a worldwide pandemic. Consequently, governments took
51 several restrictions measures, including lockdown, who affected significantly daily physical activity behaviors.
52 In France, the first lockdown began from March 17th 2020 until May 11th 2020, i.e 55 days. During this
53 lockdown, all schools were closed while the school environment for children and adolescent is crucial to be more
54 physically active and to achieve meet physical activity guidelines [7-9].

55 Physical inactivity and sedentary behaviors have adverse consequences on physical fitness levels [10]. Many
56 research studies from different countries showed a worrying decrease of physical activity levels (PAL),
57 associated to a dramatic increase of time spent in sedentary behaviors during and after lockdown [11-12].
58 Authors constated that social context, parental education level, environment and physical characteristics are
59 factors having an impact on the percentage of decrease in PAL during lockdown [13-16]. While a substantial
60 decline in physical fitness levels adolescents was already found since many decades, this public health crisis
61 might therefore accentuate this worsening trend [17-18]. Many studies performed in European and American
62 countries confirms this trend. Overall, authors showed school-aged boys and girls exhibited significant physical
63 fitness performance losses after the successive lockdowns due to coronavirus disease period [19-27]. In France,
64 data on health-related physical fitness during this period are scarce and limited to children population [24].

65 Authors showed a significant decrease on physical fitness and motor fitness performances [24]. Main limits of
66 this study are the low sample size (n=106 and 100 before and after confinements, respectively), exclusively in
67 young children. Consequently, these limits arouse a particular interest to examine the impact of public health
68 crisis in a large sample including adolescent population.

69 In this context, we hypothesize that the first lockdown had a negative impact on health-related physical fitness in
70 French adolescents. Using data from two independent large samples, the aim of this study was to examine the
71 impact of COVID-19 Pandemic Lockdown on health-related physical fitness in French adolescents.

72

73 **METHODS**

74 *Participants*

75 This study is part of the French health Diagnoform[®] programme (<https://irfo.fr/>) assessing physical fitness levels
76 in French population from the age of 5 years. A cross-sectional design was used in order to contrast health-
77 related physical fitness data of two samples of adolescents, evaluated before and after the lockdown in France.
78 For the present analysis, two cross-sectional studies were performed comparing two different groups of French
79 adolescent students, who studied at the same school at two different school years (before and after the first
80 lockdown, i.e september 2020 and September 2021).

81 A total of 1231 adolescents participated in the two independent large samples. Complete data for physical fitness
82 and anthropometrics data were obtained for all participants. Before and after lockdown, 532 adolescents (318
83 boys, 214 girls) and 699 adolescents (325 boys, 374 girls) participated, respectively. Anthropometric
84 characteristics and physical fitness were measured.

85 All data obtained from the organizer “Institut des Rencontres de la FORMe” of the event were anonymized, and
86 declared and approved by the Commission Nationale de l’Informatique et des Libertés (National Commission on
87 Informatics and Liberty). The assessment was explained to both adolescent and their parents, after which the
88 children or their parents could accept or decline record anonymously their information technology data. Data
89 were recorded by the organizer in an electronic data system. An audit of the complete dataset was performed,
90 and aberrant data were excluded. As this research was not performed to improve biological or medical Human
91 knowledge, this present study is not considered as clinical research according to French regulatory requirement
92 (“Jardé” law). In this context, this study does not need any approval from an ethical committee [28].

93

94 *Anthropometric characteristics*

95 Body weight was measured with the participant wearing light clothes and without shoes to the nearest 0.1 kg
96 using an electronic scale (Seca, Hamburg, Germany). Height was measured without shoes to the nearest 0.1 cm
97 using a standard physician's scale (Seca, Hamburg, Germany). Body Mass Index was calculated as
98 weight/height² (kg/m²). Normal weight, overweight and obesity were assessed using specific thresholds
99 according to WHO classification [29]. These international cut-offs are defined by values of BMI at age 18: BMI
100 18.5 normal weight, 25 (overweight) and 30 (obesity).

101

102 *Physical fitness*

103 Health-related physical fitness procedures have been described below and its reliability and validity indicated, as
104 previously published [30-32].

105

106 *Cardiorespiratory Fitness* (CRF) was measured by a 20-meter shuttle run-walk test during 6 min. This test has
107 been validated against the 20-m shuttle run reference test from Leger et al (1988) ($r = 0.78$; $P = 0.001$) and
108 showed a good reliability (0.84) [30]. Adolescents were instructed to run and walk as far as possible between
109 two lines located 20 m apart during 6 min. The adolescent ran as quickly as possible from the starting line to the
110 other line and returned to the starting line at a fast walking pace, crossing each line with at least one foot
111 throughout the complete test. The test began on the whistle and was concluded after 6 min. The distance covered
112 by the adolescent was recorded and was expressed in meter (*m*).

113

114 *Lower Explosive strength* (LES) was assessed by the standing broad jump test. This test showed a good
115 reliability (0.84) [30]. From a starting position immediately behind a line, standing with the feet approximately
116 shoulder width apart, adolescent jumped as far as possible with their feet together. The result was recorded in
117 cm. A nonslip hard surface, chalk and a tape measure were used to perform the test.

118

119 *Speed/agility* (SA) was assessed by the 4 × 10 m shuttle run test. An excellent reliability was found for the
120 4x10m shuttle run in adolescent (0.90) [30]. Two parallel lines were drawn on the floor 10 m apart. The
121 adolescent was instructed to run as fast as possible from the starting line to the second line and return, crossing
122 each line with at least one foot every time. The test covered a total distance of 40 m (4 x 10 m). Test time ended
123 when the adolescent crossed (again, keep verb tenses consistent) the end line with one foot. Time was recorded
124 using a standard stop watch.

125

126 *Upper muscular strength and endurance* (UMSE) was assessed by the pushup test with knees on the ground. A
127 good reliability was found for this test (0.81) [30]. Before the beginning of this test, participants did some light
128 warm-up of arms and shoulders. Participants were positioned prone with hands shoulder width apart with the
129 trunk held in a rigid, straight position. Participants began in the “up” position with their elbows fully extended.
130 When descending the body toward the ground adolescents flexed their elbows until the upper arm was parallel to
131 the testing surface. They were instructed to limit head and trunk motion, and to perform as many push-ups as
132 they can without break. No limit of time was defined. The result of the test was expressed in number of push’ups
133 seconds (*n*).

134

135 *Lower muscular strength and endurance* (LMSE) was assessed by the five consecutive long jump. The reliability
136 for this test was excellent (0.90) [30]. From a starting position immediately behind a line, standing with the feet
137 approximately shoulder width apart, adolescent jumped five times consecutively (without break) as far as
138 possible with their feet together. A nonslip hard surface, chalk and a tape measure were used to perform the test.
139 The result was recorded in cm.

140

141 *Speed Body Displacement* (SBD) was assessed by a 30-m speed test. This test showed a good reliability (0.85)
142 [30]. This test was performed by running as fast as possible for 20 *m*. The adolescent stood still in a comfortable
143 position, feet behind the starting line, with no rocking movements. The test began on the whistle and was
144 concluded when the adolescent crossed the finish line. Time was recorded using a standard stopwatch. The result
145 of the test was expressed in seconds (*sec*).

146

147 *Coordination* was assessed by the five consecutive strides test. This test showed also an excellent reliability
148 (0.90) [30]. The adolescent stood still in a comfortable position, feet behind the starting line, with no rocking
149 movements. Adolescent performed five consecutive strides as far as possible. A nonslip hard surface, chalk and a
150 tape measure were used to perform the test. The result was recorded in cm.

151

152 *Flexibility* was assessed by a test measuring leniency and the capability to reach down as far as possible. An
153 excellent reliability was found (0.91) [30]. From a standing position, with both legs straight and feet together, the
154 participant flexed their trunk and reached down as far as possible with their hands. Participant had to maintain

155 the position for 3 sec. Results of this test were indexed: a score of 5 for placing the hands flat on the ground; 4
156 for fingers touching the ground; 3 for fingers reaching the ankle; 2 for fingers reaching the tibia; and 1 for
157 fingers/hands reaching the knees.

158
159 An individual global physical fitness score, called Quotient of Physical Fitness (QPF), was calculated. For this,
160 absolute value obtained for each test was transformed to a normalized value from 1 (poor) to 20 (excellent). The
161 mean of the normalized values for each test was computed to obtain the QPF expressed in “percentage”.

162

163 *Statistical analysis*

164 Continuous variables were expressed as means (standard deviation, SD) and categorical variables were
165 expressed as numbers (percentage). Physical fitness components were described according to gender and time of
166 assessment (pre and post lockdown samples). We assessed the difference between physical fitness tests
167 performed in pre lockdown and post lockdown samples 2 using an independent t-test for continuous data, and
168 chi2 test for categorical data. Values of $p < 0.05$ were considered statistically significant. All analyses were
169 computed using R software (version 4.2.0).

170 **RESULTS**

171 Table 1 shows the characteristics of the study population of adolescents from pre and post lockdown samples.

172 No meaningful difference in anthropometrics characteristics was found between two samples.

173 Physical fitness levels according to sex among pre and post lockdown samples are described in Table 2 and

174 Figure 1. In two independent samples, physical fitness was better in boys than in girls, except for the flexibility

175 test. Overall, significant differences were found between two samples for each physical fitness components.

176 Adolescents from sample 2 (after the first lockdown) showed lower physical fitness levels compared to

177 adolescents from sample 1. Regarding physical fitness for boys and girls, physical fitness levels were

178 significantly lower in both sex between adolescents from the pre lockdown sample and adolescents from the post

179 lockdown sample, except for cardiorespiratory fitness and flexibility for boys and girls, respectively. In boys, the

180 performance of the cardiorespiratory fitness test was found to be significantly better for adolescents from post

181 lockdown sample compared those from pre lockdown sample (579.9 ± 149.9 vs. 575.6 ± 98.0 ; $p < 0.01$). A

182 similar trend was also found in adolescents girls for the flexibility test. In addition, and naturally in front of

183 previous results mentioned above, the physical fitness global score (expressed in percentage) was also

184 significantly lower between adolescents from the pre and post lockdown samples for boys (57.8 ± 12.6 vs $52.2 \pm$
185 14.5 ; -9.8% , $p < 0.01$) and girls (34.9 ± 10.8 vs 29.1 ± 11.1 ; -16.2% ; $p < 0.01$), respectively. Adolescents' girls
186 have had a difference more important of their global score physical fitness levels (-16.2%) compared to
187 adolescents boys (-9.8%).

188 Figure 2 showed difference in performance for each physical fitness tests between pre and post lockdown
189 samples. Only the percentage difference of cardiorespiratory fitness in boys is positive, but remains low
190 ($+0.7\%$). Overall, the higher difference was found for performance in the speed body displacement test (-30%).
191 A difference of 12.8% and 25% were observed for boys and girls, respectively. In contrast, the weaker change in
192 overall was found in cardiorespiratory fitness results (-4.2%). The most slighty difference for girls was to -4.8%
193 in cardiorespiratory fitness level, and -3.9% for boys in performance for upper body muscular strength and
194 endurance.

195

196 **DISCUSSION**

197 The aim of this study was to assess, for the first time, the impact of the lockdown on the physical fitness levels in
198 French adolescents.

199 The first main result from our study showed that both boys and girls had lower performance to physical fitness
200 tests after the first covid-19 lockdown, expect for CRF in boys adolescent. Therefore, our initial study hypothesis
201 is accepted. Our results are in agreement with a precedent study performed in French younger children [24].
202 Authors showed both muscular strength (upper and lower) and cardiorespiratory fitness were significantly
203 reduced among 3rd- and 4th-grade children after the COVID-19 lockdown period compared with pre-pandemic
204 performances [24]. Similar results were also found in adolescence population across many countries [19,23,25-
205 27]. Our result is definitely not surprising in light of major movement restrictions involved by the French
206 government during the pandemic situation in France. The decline of health-related physical fitness may be
207 attributed to change lifestyle behaviors, i.e a decrease of physical activity levels, a sedentariness rising and
208 unhealthy dietary intake. As previously described, schools, sports clubs and associations have closed during the
209 lockdown inducing a decrease of opportunity to be physically active. Studies showed that school environment
210 (recess, physical education lessons, commuting home to school) was favorable to be active and meet the WHO
211 recommended physical activity guidelines [8, 33-34]. In addition, leisure-time out-of-school hours is used

212 mainly for sedentary activities [8]. Several studies in Europe confirmed these facts reporting a reduced physical
213 activity level and increased sedentary behaviors in adolescents during lockdown period [35-37].

214 Another outcome found from our study was to note more evident global difference between pre and post
215 lockdown in girls compared to boys. Expect to lower muscular strength and endurance test, girls had greater
216 difference between before and after first lockdown in physical fitness performance compared to boys
217 adolescents. Our results are contradictory to those previous studies in European adolescents [23, 25]. Sunda et al
218 (2022) showed a greater impairment in 600 m run and sit-up performance in Croatian boys than in girls after two
219 months of lockdown [25]. Tsoukos et al (2022) reported also a greater reduction in performance in flexibility,
220 505 agility and 30 m sprint tests in Greek boys compared to girls after 5-month lockdown [23]. We have no clear
221 explanation for this difference between our findings and those found in previous studies. Authors explained their
222 difference found lower in girls by the possibly greater decrease in physical activity in boys than in girls.
223 However, recent studies assessing changes in physical activity patterns due to lockdown showed that there was
224 no difference in decrease between girls and boys adolescents [25,37]. A possible explanation in the sex
225 difference in our study might be due the motivation to practice physical activity during the pandemic period.
226 Lack of willpower is reported as a main barrier in girls to perform exercise [38]. However, since we did not
227 assess physical activity patterns in the present study, we cannot speculate more about their roles in explaining a
228 greater physical fitness levels impairment in girls compared to boys adolescents and should deserve further
229 studies.

230 Lastly, our study revealed no consequences of the COVID-19 pandemic and imposed lockdown on the
231 anthropometric data in French adolescents. Sunda et al (2022) found similar results in their Croatian cohorts
232 [25]. To explain these results, authors have underlined that adolescence is a life period very dynamic and
233 characterized by rapid changes in body composition (weight, height) and the availability of food and nutritional
234 habits, which are major determinants of growth, have not changed dramatically during the pandemic [25].
235 However, an Italian study showed that children and adolescents confined due to Covid-19 pandemic showed
236 higher unhealthy foods, such as red meat, potato chip, and sugary drink consumption [39]. Our finding might be
237 attributed rather to the duration of movement restriction and lockdowns, not long enough to see a change in
238 anthropometric characteristics. Indeed, weight gain is caused by the combination of a less active lifestyle,
239 including sedentary behaviors, and a failure to reduce energy intake to match the reduced total energy
240 expenditure arising from reduced physical activity over a prolonged period of time. Our data concern only the

241 impact of the first lockdown, including 55 days. By consequent, this period seems too short to observe changes
242 in body composition unlike to physical fitness where short term physical inactivity (less than 4 weeks) have
243 already an impact [40].

244 Previous studies shows that the COVID-19 is associated with direct adverse health consequences in short and
245 long term [41]. Results from our study shows also an indirect impact on the health. Indeed, lockdown periods
246 have decreased in performances of physical fitness tests in youth whereas a poor physical fitness level in
247 adolescence is strongly associated with all-cause mortality and cardiovascular- and cancer-specific mortality in
248 later life [4-5]. Recently, data from a large prospective register have also showed linking physical fitness at a
249 young age is associated with severity of COVID-19 many years later [42]. In order to counteract the detrimental
250 effects of the COVID-19 disease, his multiples lockdown and social distancing imposed on physical fitness
251 levels among adolescents, there is a need to develop preventive strategies. Developing online intervention
252 programs of physical activity might be also a relevant strategy whether further mitigation would be taken.
253 Indeed, many studies showed that a remote physical education intervention maintained or even increased
254 physical fitness levels in children and adolescents [43-45].

255 Findings from our study brings first data on the health-related physical fitness consequences due to lockdown in
256 French adolescents. However, some limitations have to be considered. The main limitation is the design of this
257 study (cross-sectional design). Indeed, since the lockdown was unexpected, a longitudinal study was not
258 possible. However, we were able to assess physical fitness across two cross-sectional studies in adolescents
259 studying in the same school (i.e, same region and city in North of France). In light of this first limitation, our two
260 studies cohort are not representative of the French adolescent populations. Lastly, we did not collect several
261 qualitative and quantitative data, such as parents' education level, socioeconomic status or daily physical
262 activity, which have effects on health-related physical fitness in adolescents.

263 Findings of this present study demonstrate the negative impact of COVID-19- Pandemic Lockdown on health-
264 related physical fitness in French adolescents. After this public health crisis, still current, public health policies
265 must continue to promote a healthy lifestyle (dietary intake and physical activity) in youth in order to counterpart
266 adverse health consequences of these consecutives lockdown. Moreover, teachers and school policies should
267 include specific and adequate PA programs adapted to the age to reduce the risk of decrease of physical fitness
268 level when possible movement restrictions periods could occur. Further studies on the effects of the second and
269 third lockdown in France are warranted and expected. In addition, future studies should be performed across

270 several years in order to assess the impact of this health crisis on physical fitness among adolescents in a long-
271 term.

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458 **Statements and Declarations**
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460 **Conflict of interest**

461 The remaining authors state no conflict of interest.

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463 There is not support for this research.

464 **Authors contributions**

465 Jérémy Vanhelst, Laurent Béghin and David Thivel conducted the initial analyses and drafted the initial
466 manuscript.

467 Jean-Benoît Baudelet conducted statistical analysis and drafted the initial manuscript.

468 Hervé Ovigneur, Thibault Deschamps designed data collection instruments, coordinated and supervised data
469 collection and reviewed the manuscript.

470 All authors approved the final manuscript as submitted and agree to be accountable for all aspects of the work.

471 **Ethics approval**

472 As this research was not performed to improve biological or medical Human knowledge, this present study is not
473 consider as a clinical research according to French regulatory requirement (“Jardé” law). In this context, this
474 study do not need any approval from an ethical committee.

475 **Consent to participate**

476 NA

477 **Consent for publication**

478 NA

Table 1. Characteristics of the study population of adolescents for two cohorts.

| | Pre lockdown sample | Post lockdown sample | P |
|----------------------|---------------------|----------------------|------|
| Total | | | |
| N | 532 | 699 | |
| Age (y) | 16.5 ± 2.0 | 16.6 ± 1.1 | 0.17 |
| Height (cm) | 168.3 ± 8.9 | 168.4 ± 10.3 | 0.80 |
| Body mass (kg) | 62.1 ± 12.7 | 61.2 ± 12.2 | 0.19 |
| BMI ($kg.m^{-2}$)* | 21.9 ± 3.7 | 21.8 ± 7.8 | 0.81 |
| Boys | | | |
| N | 318 | 325 | |
| Age (y) | 16.5 ± 2.2 | 16.7 ± 1.1 | 0.17 |
| Height (cm) | 172.7 ± 7.6 | 174.7 ± 9.2 | 0.79 |
| Body mass (kg) | 65.6 ± 13.4 | 65.5 ± 13.2 | 0.19 |
| BMI ($kg.m^{-2}$)* | 21.95 ± 3.98 | 21.71 ± 8.25 | 0.81 |
| Girls | | | |
| N | 214 | 374 | |
| Age (y) | 16.5 ± 1.6 | 16.6 ± 1.1 | 0.17 |
| Height (cm) | 161.8 ± 6.4 | 163.0 ± 7.9 | 0.80 |
| Body mass (kg) | 57.0 ± 9.6 | 57.4 ± 9.7 | 0.19 |
| BMI ($kg.m^{-2}$)* | 21.76 ± 3.38 | 21.86 ± 7.50 | 0.81 |

* BMI : Body Mass Index

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Table 2. Physical fitness levels (mean \pm SD) according to sex among two cohorts

| | | Pre lockdown sample | Post lockdown sample | P |
|---------------------------|-------|----------------------------|-----------------------------|----------|
| CRF* (m) | Total | 538.9 \pm 101.2 | 516.3 \pm 159.5 | 0.002 |
| | Boys | 575.6 \pm 98.0 | 579.9 \pm 149.9 | 0.002 |
| | Girls | 484.4 \pm 78.9 | 461.0 \pm 146.6 | 0.002 |
| LES* (m) | Total | 184.4 \pm 39.4 | 161.1 \pm 36.3 | < 0.001 |
| | Boys | 203.1 \pm 34.1 | 184.2 \pm 30.9 | < 0.001 |
| | Girls | 156.5 \pm 28.9 | 141.1 \pm 27.7 | < 0.001 |
| Speed/agility (s) | Total | 10.8 \pm 1.52 | 12.1 \pm 2.6 | 0.003 |
| | Boys | 10.2 \pm 1.2 | 11.1 \pm 2.2 | < 0.001 |
| | Girls | 11.8 \pm 1.5 | 13.0 \pm 2.6 | < 0.001 |
| UMSE* (n) | Total | 32.5 \pm 21.0 | 28.0 \pm 19.1 | < 0.001 |
| | Boys | 40.8 \pm 20.7 | 39.2 \pm 19.2 | < 0.001 |
| | Girls | 20.4 \pm 14.7 | 18.2 \pm 12.5 | < 0.001 |
| LMSE* (cm) | Total | 931.6 \pm 209.2 | 835.5 \pm 216.1 | < 0.001 |
| | Boys | 1036.3 \pm 170.1 | 957.1 \pm 198.7 | < 0.001 |
| | Girls | 776.1 \pm 159.5 | 729.8 \pm 170.3 | < 0.001 |
| SBD* (sec) | Total | 5.0 \pm 0.9 | 6.5 \pm 2.0 | < 0.001 |
| | Boys | 4.7 \pm 0.7 | 5.3 \pm 1.4 | < 0.001 |
| | Girls | 5.6 \pm 0.9 | 7.0 \pm 1.9 | < 0.001 |
| Coordination (cm) | Total | 1012.8 \pm 167.6 | 875.2 \pm 195.4 | < 0.001 |
| | Boys | 1096.2 \pm 139.8 | 989.3 \pm 166.9 | < 0.001 |
| | Girls | 888.7 \pm 122.9 | 776.1 \pm 161.5 | < 0.001 |
| Global score (/20) | Total | 48.6 \pm 16.4 | 39.9 \pm 17.2 | 0.004 |
| | Boys | 57.8 \pm 12.6 | 52.2 \pm 14.5 | 0.004 |
| | Girls | 34.9 \pm 10.8 | 29.1 \pm 11.1 | 0.004 |

* CRF: Cardiorespiratory fitness; LES: Lower explosive strength; UMSE: Upper muscular strength and endurance; LMSE: Lower muscular strength and endurance; SBD: Speed body displacement.

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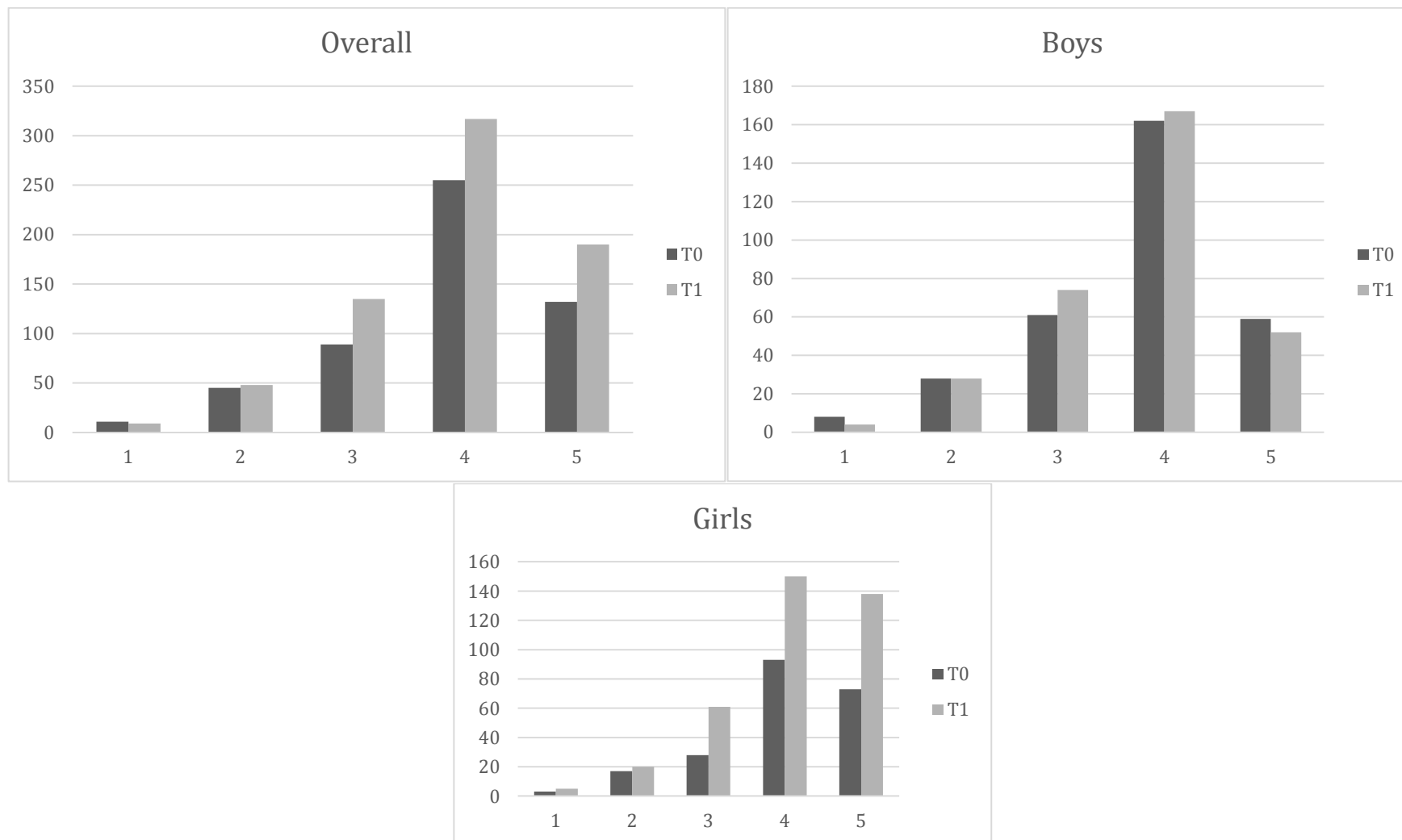
491 **Legends**

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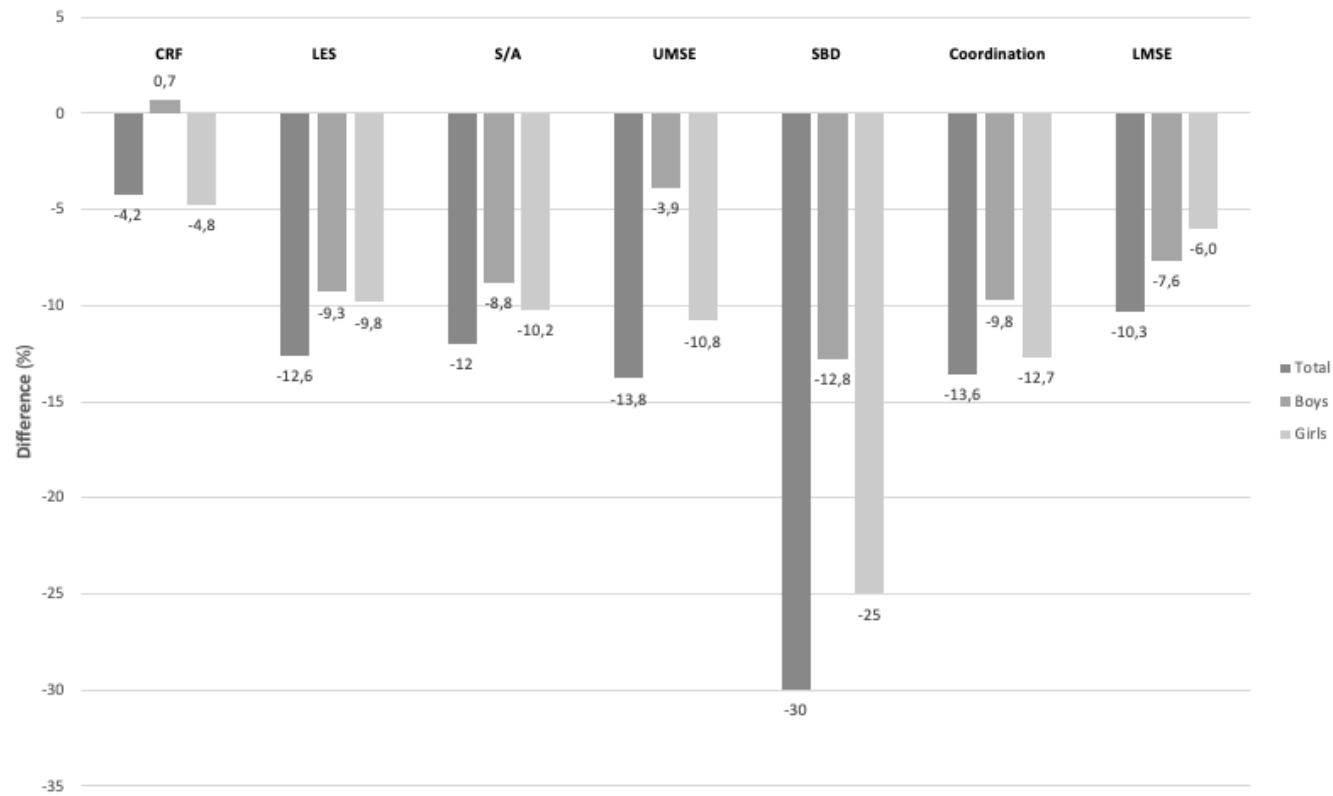
493 **Figure 1.** Flexibility levels (n) according to sex between pre (T0) and post (T1) lockdown samples.

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495 **Figure 2.** Difference (%) in physical fitness levels between pre (T0) and post (T1) lockdown samples.



Significant difference were found overall and according to sex ($P < 0.01$).



All difference were statistically significant ($P < 0.01$).