Effects of Multicomponent Training and Subsequent Lockdown (COVID-19) in Older People

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Abstract

Multi-component training has proven to be the best non-pharmacological strategy to reverse or delay the effects associated with ageing and frailty, which have both become a health emergency. The aim of this study was to analyse the impact of a period of lockdown following a multicomponent training programme on functional capacity, physical fitness and quality of life in older people. A total of 54 participants over the age of 65 were randomly divided into two groups. The intervention group performed 3 weekly sessions of 1 hour of multicomponent training, and the control group, 1 hour of light aerobic activity per week. The Short Physical Performance Battery (SPPB), Senior Fitness Test (SFT), Handgrip and EUROQOL-5D were used: Visual Analogue Scale (EQ-5D: VAS). At the end of lockdown, both groups became worse in SPPB, although the intervention group to a lesser extent (Control, -10.34%, p = .015, ES = .758; Intervention, -6.48%, p = .018, ES = .470). In addition, this group improved strength (Chair Stand, +11.12%, p = .002, ES = .632), and flexibility (Sit & Reach, -48.88%, p = .001, ES = .698) of the lower limb as well as agility and dynamic balance (Up & Go, -10.68%, p < .001, ES = .667), due to possible residual effects of training. Only the control group reduced their manual grip strength (-5.57%, p = .033, ES = .665).

Conclusion: 9 weeks of multicomponent training in older people could mitigate the effects of a 15-week lockdown, but it is not possible to know with certainty due to the lack of a post-training measurement, which could not be performed because of the outbreak of the pandemic.

Keywords: elderly, exercise, functional physical performance, physical condition, quality of life.
**Introduction**

The United Nations stated that in recent years the world’s population of people over 65 years of age has tripled and, between 2025 and 2030, it is expected to increase 3.5 times faster than the total population (Lutz et al., 1997). This increasing ageing of the world’s population and the corresponding challenges of caring for the growing number of older people have become a “silent” emergency for all health services (Casas-Herrero et al., 2019). However, ageing is a natural physiological process, which is affected by lifestyle factors that include frequent physical activity, which has numerous benefits during ageing: improved cardiorespiratory fitness, maintenance of muscle mass, reduced risk of type II diabetes, improved cognitive function, among others (Harridge & Lazarus, 2017). On the other hand, unhealthy ageing, mainly characterised by a sedentary lifestyle, can lead to further deterioration of physiological systems.

Some of the systems most directly affected by these changes are the cardiorespiratory and neuromuscular systems, which are increasingly impaired (Hurst et al., 2019), leading to a reduction in functional capacity and physical fitness and contributing to the onset of frailty. This age-associated clinical syndrome is characterised by a decline in biological reserves, and is defined by vulnerability and increased risk of developing negative outcomes such as disability, dependence or death (Rodríguez-Mañas et al., 2013). Therefore, and because of its high prevalence (7.0% - 16.3%) in the elderly population, the prevention and treatment of frailty is a major concern in the field of geriatrics (Rodríguez-Mañas & Fried, 2015) and the field of health in different countries.

There is no doubt that this progressive deterioration of physical condition and functional capacity, as well as its consequences mentioned above (frailty, disability and dependence), leads to an inevitable loss of quality of life. Therefore, it is urgent and important to study and find solutions to reverse, or at least delay, the aforementioned negative outcomes associated with ageing and frailty. One of the most promising and effective proposals within non-pharmacological therapies is multicomponent adapted physical exercise (Casas-Herrero et al., 2019). In recent years, multicomponent training has shown improvements in physical fitness (Viladrosa et al., 2017), functional performance and quality of life (Bouaziz et al., 2016) in older people.

However, the COVID-19 pandemic has created an unprecedented situation in which the population, and more specifically the older population, was forced into lockdown, which drastically reduced their physical activity levels and made it impossible to follow any physical exercise programme. Especially in a highly vulnerable population such as the elderly, for whom inactivity is known to have serious negative effects on their health (Harridge & Lazarus, 2017). On the other hand, this context has made it possible to study and evaluate the possible preventive effect of a multicomponent training programme in elderly people who were subjected to subsequent lockdown.

Therefore, the aim of this study was to analyse the combined effect of 9 weeks of multicomponent training and a subsequent 15-week lockdown period on functional capacity, physical fitness and quality of life in older people.

**Methodology**

This study is part of the EXERNET-Elder 3.0 project, a multicentre study registered in ClinicalTrials.gov (NCT03831841), which was carried out in two cities (Zaragoza and Huesca). The aim of this project was to evaluate the effects of a 24-week multicomponent training programme on frailty, physical fitness, body composition and quality of life, as well as to analyse a potential role of dietary intake, in more than 100 older people (Fernández-García et al., 2020). However, the health crisis caused by COVID-19 did not allow the study to be carried out as originally designed.

**Participants**

Participants were non-institutionalised elderly people from the city of Huesca, and were recruited by health personnel through health centres in the city. The inclusion criteria, therefore, were: being over 65 years of age, not living in a nursing home and having no medical contraindications for physical exercise.

Using the software G*Power 3.1.9.6 an initial sample size of 28 participants for the intervention group and 14 for the control group was calculated, allowing for a between-group difference of 2 points on the SPPB scale (SD = 2.1), a statistical significance of $p \leq .05$ and a statistical power of 80%. Based on a previous study by Tarazona-Santabalbina et al. (2016), in which they found a post-intervention difference between groups of 2.4 points for this variable. The initial calculated sample of 42 participants was increased by 15% for possible loss to follow-up, and a further 15% for mortality. This resulted in an initial study sample of 54 participants,
divided between the intervention group \((n = 34)\) and the control group \((n = 20)\). To ensure that there were no significant differences between groups at the start of the study for any variable, an independent samples analysis was performed on each variable.

**Materials and Resources**

The first measurement was taken in December 2019, before the exercise intervention. The training programme started in January 2020 and was interrupted in March due to lockdown. The second measurement was carried out when possible, in June 2020, at the end of lockdown. This measurement included a COVID-19 safety protocol, which included personal distancing measures, hand hygiene, use of masks and disinfection of all equipment used. Participants were tested in groups of 3-4 people.

Height was measured with a stadiometer accurate to 0.1 cm (SECA 225, SECA, Hamburg, Germany) and weight was measured with an electronic scale accurate to 0.1 kg (SECA 861, SECA, Hamburg, Germany), without shoes and with as little clothing attire as possible.

This was followed by the Short Physical Performance Battery (SPPB; Guralnik et al., 1994), and the Senior Fitness Test (SFT; Rikli & Jones, 2001). The 6-Minute Walk test proved impossible to carry out, as the nature of the test meant that protocols against COVID-19 could not be assured. In addition, maximum isometric handgrip force was measured on both arms and legs with a handheld digital dynamometer accurate to 0.1 kgf (Takei TKK 5401, Takei Scientific Instruments, Tokyo, Japan). The validated EUROQOL-5D - Visual Analogue Scale (EQ-5D) was used to assess the quality of life of the participants: VAS; Devlin and Brooks, 2017).

**Procedure**

The project was conducted in accordance with the ethical principles of the 1961 Declaration of Helsinki, as revised in Fortaleza (World Medical Association, 2013), and obtained the evaluation and approval of the Clinical Research Ethics Committee of the Hospital Universitario Fundación Alcorcón. All participants who formed the initial sample of the study completed and signed an informed consent form. Then, participants were randomly divided into two groups: an intervention group, which performed a multicomponent training programme, and a control group, which performed light-intensity aerobic activity.

The complete and detailed training protocol has been described by Fernández-García et al. (2020). In summary, the intervention group undertook 3 weekly multicomponent training sessions of one hour’s duration. All sessions included:

1. 10 minutes of warm-up, in which mobility exercises, cardiopulmonary activation, coordination and dynamic balance games were carried out.
2. 40 minutes of the main part (2 types):
   a. Circuit of muscular strength exercises, lower and upper limb with light-moderate weights, and static balance exercises (2 sessions per week).
   b. Circuit of aerobic resistance exercises, at a light-moderate intensity, and dynamic balance and coordination exercises (1 session per week).
3. 10 minutes of cool down, including light intensity games and static stretching of the lower and upper limbs.

During the 9 weeks of intervention, the principles of individualisation and progression of the training load were followed to ensure an adequate stimulus for each participant. On the other hand, the control group performed a weekly one-hour session of walking and light-intensity tasks. All sessions were designed and supervised by a graduate in Physical Activity and Sport Sciences (CCAFL).

After 9 weeks of intervention, on the 11th of March 2020, the World Health Organisation declared COVID-19 a pandemic. Consequently, on the 14th of March, the Spanish government decreed a state of alarm which was extended until the 21st of June 2020 as a measure to deal with the spread of COVID-19. The intervention was inevitably interrupted. Consequently, the remaining 15 weeks corresponded to a period of lockdown at home in which no physical activity guidelines were provided. The results expected in this study (Table 2) were therefore inevitably affected by this situation.

**Statistical Analysis**

For the statistical analysis, the software SPSS version 23.0 was used. For descriptive analysis, the data are presented with the mean, as a measure of central tendency, and standard deviation, as a measure of dispersion. In addition, the normal distribution of the variables was determined using the Shapiro-Wilk test.

For the inferential analysis, in order to establish whether there were differences between groups before the intervention, an independent samples Student’s \(t\) test was performed for the descriptive variables, of a numerical nature and with a normal distribution, and a Chi-Square test in the case of the “sex” variable, as it is a nominal variable.
For the variables of interest, a Student’s test for related samples \( t \) was used for those with a normal distribution. Its non-parametric counterpart, the Wilcoxon signed-rank test, was also used for variables that did not have a normal distribution. Both tests were used to determine whether there were differences before and after the intervention, within each group. An independent samples analysis, Student’s \( t \) test or Mann-Whitney U-test, was also included, based on the normality of the variables, to determine whether there were differences between groups before and after the intervention. In all tests, statistical significance was established for a \( p < .05 \).

The calculation of effect sizes was performed with the software G*Power 3.1.9.6, considering a large effect size \( ES \geq .8 \), a medium one around \( ES \approx .5 \), and a small one around \( ES \approx .2 \).

**Results**

**Descriptive Variables**
A total of 30 participants from the intervention group and 16 from the control group were assessed after the intervention. No significant differences (\( p > .05 \)) were found between groups for any of the starting descriptive variables (Table 1), so both groups had similar characteristics at the beginning of the intervention.

**Variables of Interest**
The total score on the SPPB was significantly reduced between assessments in both groups (Table 2), although with greater percentage change and effect size in the control group (-10.34%, \( p = .015 \), \( ES = .758 \)) than in the intervention group (-6.48%, \( p = .018 \), \( ES = .470 \)).

On the other hand, in the SFT the control group did not show statistically significant differences (\( p > .05 \)) for any of the tests that make up the set. On the other hand, the intervention group did, as detailed below. Firstly, this improved its performance in Chair Stand (11.12%, \( p = .002 \), \( ES = .632 \)), reduced the distance in Sit & Reach (-48.88%, \( p = .011 \), \( ES = .698 \)), and improved time in Up & Go (-10.68%, \( p < .001 \), \( ES = .667 \)).

No significant changes were found for the Arm Curl test. Regarding isometric grip strength (Handgrip), significant reductions were found only in the control group (-5.57%, \( p = .033 \), \( ES = .665 \)) and no changes were detected in the intervention group. Quality of life assessed, using EQ-5D: V AS (from 1 to 100), showed no significant differences (\( p > .05 \)) for either group. Finally, independent samples analysis reported no differences between groups pre-intervention, and only reported differences post-intervention in the Up & Go (\( p = .034 \)) in favour of the intervention group.

**Table 1**
*Descriptive variables and group differences before the intervention.*

<table>
<thead>
<tr>
<th></th>
<th>Intervention (( n = 30 ))</th>
<th>Control (( n = 16 ))</th>
<th>( p )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>74.07</td>
<td>74.13</td>
<td>.978</td>
</tr>
<tr>
<td></td>
<td>Standard deviation</td>
<td>Standard deviation</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4.84</td>
<td>7.48</td>
<td></td>
</tr>
<tr>
<td>Sex, ( n ) (%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Men</td>
<td>11 (36.67%)</td>
<td>8 (50.00%)</td>
<td>.382</td>
</tr>
<tr>
<td>Women</td>
<td>19 (63.33%)</td>
<td>8 (50.00%)</td>
<td></td>
</tr>
<tr>
<td>Weight (kg)</td>
<td>74.30</td>
<td>71.13</td>
<td>.387</td>
</tr>
<tr>
<td></td>
<td>12.56</td>
<td>9.92</td>
<td></td>
</tr>
<tr>
<td>Height (cm)</td>
<td>158.27</td>
<td>156.95</td>
<td>.609</td>
</tr>
<tr>
<td></td>
<td>8.64</td>
<td>7.56</td>
<td></td>
</tr>
<tr>
<td>BMI (kg/m²)</td>
<td>29.68</td>
<td>28.90</td>
<td>.573</td>
</tr>
<tr>
<td></td>
<td>4.74</td>
<td>3.83</td>
<td></td>
</tr>
</tbody>
</table>

*Note. Body Mass Index (BMI).*
### Table 2
Changes in functional capacity, physical fitness and quality of life after 9 weeks of training and 15 weeks of lockdown.

<table>
<thead>
<tr>
<th></th>
<th>Intervention Group (n = 30)</th>
<th>Control Group (n = 16)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>PRE</td>
<td>POST</td>
</tr>
<tr>
<td><strong>Average</strong></td>
<td>Average</td>
<td>SD</td>
</tr>
<tr>
<td><strong>Functional Capacity</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SPPB Total (0-12 pts.)</td>
<td>10.80</td>
<td>1.63</td>
</tr>
<tr>
<td><strong>Physical Condition</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chair Stand (No. rep.)</td>
<td>14.18</td>
<td>2.86</td>
</tr>
<tr>
<td>Arm Curl (No. rep.)</td>
<td>18.82</td>
<td>4.21</td>
</tr>
<tr>
<td>Sit &amp; Reach (cm)</td>
<td>-15.65</td>
<td>10.15</td>
</tr>
<tr>
<td>Back Scratch (cm)</td>
<td>-17.85</td>
<td>8.14</td>
</tr>
<tr>
<td>Up &amp; Go (s)</td>
<td>6.78</td>
<td>2.04</td>
</tr>
<tr>
<td>Handgrip total (kg)</td>
<td>51.11</td>
<td>17.39</td>
</tr>
<tr>
<td><strong>Quality of Life</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EQ-5D: VAS (0-100)</td>
<td>69.17</td>
<td>16.97</td>
</tr>
</tbody>
</table>

Note. SD, standard deviation; ES, effect size; SPPB, Short Physical Performance Battery; EQ-5D: VAS, EuroQoL-5D: visual analogue scale; pts., points; rep., repetitions; cm, centimetres; s, seconds; kg, kilogram-force. ES calculated for changes between measurements. Significant changes between measurements for each group: * p < .05; ** p < .01; *** p < .001. Significant differences between groups: † p < .05
Discussion

Following the outbreak of COVID-19, the purpose of this study was to analyse how the physical condition, functional capacity and quality of life of people over 65 years of age had changed after 9 weeks of multicomponent training and 15 weeks of lockdown. The results of this study should be discussed with prudence, during the analysis, interpretation, and comparison with other studies; taking into account that it was not possible to have a measurement prior to lockdown that would have allowed differentiating the changes due to training and lockdown. This is perhaps one of the few works of this nature that has been conducted: exercise intervention time interrupted by a total cessation of activity due to lockdown. The findings of this work point to a significant reduction in functional capacity in both groups, as assessed by the SPPB scale (Figure 1). Although with caution, it is important to emphasise that this reduction occurred at a higher percentage change and effect size in the control group than in the intervention group. However, there were no statistically significant differences between groups. This could imply that, despite these reductions, the difference was still not so considerable from a statistical point of view, but from a functional point of view. Not forgetting that the control group has almost half as many participants as the intervention group, it is worth noting that a 1-point reduction in the SPPB scale in the control group can lead to a clinically significant decrease in the functional capacity of older people (Montero-Odasso et al., 2019). Furthermore, these results support the need to avoid lockdown and to allow physical activity in order to preserve the health of older people. Exercise is essential for maintaining health and, in fact, this is stated in several previous studies that completed a multicomponent training programme, and found improvements in functional capacity and/or significant differences between groups favourable to the intervention group (Arrieta et al., 2018; Martínez-Velilla et al., 2019; Rezola-Pardo et al., 2019; Tarazona-Santabalbina et al., 2016). Although it is not possible to know with certainty due to the lack of a post-training measurement, based on the aforementioned studies that performed similar interventions (≥ 9 weeks multicomponent training), the training period prior to lockdown may have provided a stimulus and improvements that acted as a protective factor against the decrease in activity and reductions due to lockdown. It is likely that if the intervention had been implemented as planned, statistically significant improvements in SPPB would have been found, rather than reductions in the intervention group, as in these studies.

While overall functional capacity was reduced in both groups, although apparently more so in the control group, significant improvements were observed in the intervention group in selected fitness tests of the SFT. Firstly, this group improved their lower limb strength, as measured by the Chair Stand test (Figure 1), while there was no significant change in the control group. Several multicomponent training interventions have shown significant improvements in this test for the intervention group (Cadore et al., 2014; Carvalho et al., 2009; Rubenstein et al., 2000; Toraman & Şahin, 2004), as well as significant differences between groups in favour of the same group (Arrieta et al., 2018; Rezola-Pardo et al., 2019; Toraman et al., 2004). Some of these interventions had very similar training characteristics and training periods to the one finally carried out in this study, although they did not have a detraining period as in this study. Some that did evaluate periods of cessation of training (Carvalho et al., 2009; Martínez-Aldao et al., 2020; Toraman, 2005; Toraman & Ayçeman, 2005) found significant reductions in performance on this test relative to a post-training measurement, after periods of 6, 12, 20 and up to 52 weeks. It is worth noting that Carvalho et al. (2009) reported significant reductions from pre-training values only in the control group of their study, who did not perform any training for 12 weeks. The period of lockdown in this study was 15 weeks, so it might be expected that there was a reduction in lower limb strength in the intervention group compared to post-training (which could not be assessed) and that the positive results obtained after this period were residual effects of the 9 weeks of training.

In contrast, upper limb strength, assessed with the Arm Curl test, showed reductions in both groups, although not statistically significant (Figure 1). Other interventions without a period of lockdown have found significant improvements in intervention group upper limb strength, and/or between-group differences, using this test (Arrieta et al., 2018; Carvalho et al., 2009; Rezola-Pardo et al., 2019; Toraman and Şahin, 2004; Toraman et al., 2004). After detraining periods of 6, 12, 20 and 52 weeks, significant reductions have been observed with respect to a post-training measurement (Carvalho et al., 2009; Martínez-Aldao et al., 2020; Toraman, 2005; Toraman & Ayçeman, 2005). Furthermore, after 12 weeks of cessation of training, Carvalho et al. (2009) observed...
that participants who underwent multicomponent training saw a reduction in upper limb strength levels to below baseline (pre-training) levels, which was not the case for lower limb strength, where the reduction was not as pronounced. Furthermore, Toraman (2005), after a long period of detraining (52 weeks), reported significant reductions from pre-training values in a group of 74-86 year olds, which also did not occur in lower limb strength. This suggests that upper limb strength may be lost faster than lower limb strength. This may explain why in this study improvements in upper limb strength and losses (although not significant) in upper limb strength were seen.

In terms of lower limb flexibility, specifically of the hamstring muscles, the Sit & Reach test obtained
improvements (decrease in distance reached) in the intervention group, while in the control group there were no significant changes (Figure 1). Given the magnitude of the percentage change, effect size and statistical significance, the improvements in the intervention group could be due to an improvement in the mobility and contractility of the hamstring muscles. On the other hand, upper limb flexibility, assessed with the Back Scratch test, showed no significant changes for either group. Some studies that assessed flexibility using both tests did not find significant results after a period of multicomponent training (Arrieta et al., 2018; Toraman et al., 2004), while others did observe positive results for the Sit & Reach (Taguchi et al., 2010; Toraman & Şahin, 2004) and Back Scratch (Toraman & Şahin, 2004). Significant reductions in both tests have also been reported after 6, 12 and 52 weeks of detraining (Carvalho et al., 2009; Toraman, 2005; Toraman & Ayceman, 2005) with respect to post-training. However, Martínez-Aldao et al. (2020) observed reductions in the upper limb only after 20 weeks. Again, it is possible that the improvements found in this work for the Sit & Reach test were the residual effects of the 9 weeks of training, and that there is a different rate of maladaptation between lower and upper limb flexibility that would explain the difference in results in this study.

As a last parameter of the SFT, agility and dynamic balance assessed by the Up & Go test showed an improvement in execution time in the intervention group, while no significant changes were obtained for the control group (Figure 1). However, the improvements in the intervention group did not reach the clinical significance established at 2 seconds by Montero-Odasso et al. (2019). It should also be noted that this test was the only one that reported significant differences between groups, post-lockdown, in favour of the intervention group. It is not possible to know whether this difference is due to the intervention or to learning in the execution of the test. It should be noted, however, that participants in both groups performed the test the same number of times. So, if there was a learning effect of this test, it was not more favourable in one group than the other. Several studies have reported improvements between assessments and/or significant differences between groups in favour of the intervention group for this parameter (Cadore et al., 2014; Carvalho et al., 2009; Freiberger et al., 2012; Toraman et al., 2004; Toraman & Şahin, 2004). In terms of detraining periods, significant increases in the running time of this test have been reported after 6, 20 and 52 weeks (Martínez-Aldao et al., 2020; Toraman, 2005; Toraman & Ayceman, 2005), which would indicate a reduction in agility and dynamic balance in their respective samples. However, Carvalho et al. (2009) reported no significant changes in this test after 12 weeks of detraining of the intervention group, compared to a post-training measurement. Furthermore, Freiberger et al. (2012) continued to find differences between groups in favour of the group that combined aerobic, strength and balance (multicomponent) training, even after 12 months of detraining. It was not until 24 months that these statistically significant differences were no longer present. The findings of the latter two studies, together with those of this study, could indicate that multicomponent training would provide greater durability of effects on agility and dynamic balance, assessed through the Up & Go test, with respect to other tests and components of physical fitness.

Maximum isometric handgrip strength, as a predictor of mortality and a biomarker of ageing, was significantly reduced only in the control group (Figure 1). Taguchi et al. (2010) found no significant improvements in their intervention group, but did find reductions in their control group for this parameter. Again, some protective effect of prior multicomponent training on grip strength could be suggested, although it is not possible to establish with certainty whether this was the case in this study. Other studies did observe improvements in Handgrip in the intervention group, as well as reductions in the control group (Cadore et al., 2014; Martínez-Velilla et al., 2019). It is possible that, had the 24 weeks of training been completed or had measurements been available after 9 weeks, improvements would have been found for the intervention group.

As for quality of life, assessed by EQ-5D: VAS was not modified after 9 weeks of training and 15 weeks of lockdown in any group. Other studies have reported positive results in the EQ-5D: VAS, in favour of the intervention group (Martínez-Velilla et al., 2019; Tarazona-Santabalbina et al., 2016). It is possible that, after the 9 weeks of training, there were improvements in the participants’ quality of life, but that after 15 weeks of lockdown they were reversed. It should also be noted that the post-lockdown situation itself, and the emergence of a new pandemic crisis, had a negative impact on the subjective perception of quality of life, due to the participants’ state of mind as a result of this novel situation. No studies have been found that have observed reductions in quality of life after a period of detraining, as assessed by this scale. This is why future studies on this matter are required.

Finally, the main limitation of this work has been the interruption of the training programme, without the possibility to perform measurements before lockdown, which would have allowed a clear differentiation between training and detraining effects. The time between the two measurements and the period of physical inactivity would require another phase of continuous work, which unfortunately could not be achieved. In terms of strengths,
it is worth highlighting the well-defined and well-founded study design and training protocol, with planning and direct supervision by a CCAFD graduate. Future research should remedy the main limitation of this work and, in the event of another pandemic, have a protocol for action that allows intervention to continue in a population group in which the use of technology is not straightforward. Even so, it seems that the existing evidence positions multicomponent training as one of the best strategies to improve functional capacity, physical fitness and quality of life in older people.

Conclusions
The 24-week multicomponent training intervention could not be completed. Instead, 9 weeks of multicomponent training and 15 weeks of lockdown were performed, without the possibility of a pre-lockdown measurement. However, participants over 65 years of age who underwent 9 weeks of intervention had a smaller reduction in functional capacity and grip strength after lockdown. Furthermore, in this group, even after 15 weeks of detraining, improvements were observed in lower limb strength and flexibility, as well as in agility and dynamic balance compared to pre-training levels. However, perceived quality of life did not show significant changes in either group. Future studies should strive to include a measurement prior to the detraining period as other studies have included, which could not be included in this one due to a lockdown as a result of the pandemic. Other avenues that could be opened up from this study would be to compare a lockdown in which certain levels of training have been maintained at home versus a more sedentary lockdown. In addition, the time needed to reverse the negative effects of lockdown could also be investigated. Nonetheless, the results of this study show the need to promote physical exercise in elderly people and to avoid lockdown in order to preserve the health of the older population and to prevent/treat frailty, disability or dependency.

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