# Long-term efficacy and effectiveness of a behavioural and community-based exercise intervention (Urban Training™) to increase physical activity in patients with COPD. A randomised controlled trial

## SUPPLEMENTARY MATERIAL

## METHODS (*Complete version*)

### Study patients

We recruited patients from 33 primary care centres and hospitals from five Catalan [1] seaside municipalities: Viladecans, Gavà, Barcelona, Badalona and Mataró. First, we identified all subjects with a diagnosis of COPD according to the American Thoracic Society and European Respiratory Society (ATS/ERS) recommendations (post-bronchodilator forced expiratory volume in the first second ($FEV_1$) to forced vital capacity (FVC) ratio <0.70) [2] who were seen in any of the participating health centres. Then we excluded those with at least one of the following exclusion criteria: age<45 years; spending >3 months/year away from their home address; living more than 500 meters from any of the Urban Training™ trails [3] used for the study; or mental disability, severe psychiatric disease, comorbidity limiting survival at one year, or any other severe comorbidity according to medical history. All candidate patients were approached in random order within each municipality (of note, Viladecans and Gavà were grouped because they are conurbated municipalities). Patients were included consecutively in the study until the end of the recruitment period specified for each geographical area. We included only clinically stable patients (defined as at least 4 weeks without antibiotics and/or oral corticosteroids). We finally included a total of 407 COPD patients: 187 from Barcelona, 28 from Badalona, 73 from Mataró, and 119 from Viladecans/Gavà. The Ethics Committees of all participating institutions approved the study, along with the request for complete information exemption from patients, and all participants provided written informed consent. Recruitment began on 30 October 2013, and final outcome assessments were completed on 29 January 2016.

### Study design

This is a prospective, multicentre, parallel-group, randomised controlled trial registered at the clinicaltrials.gov online database (NCT01897298) and reported according to the 2010 CONSORT statement [4] and its extension for non-pharmacological interventions [5]. The study consisted of four visits (figure 1 of the main text): the first visit for enrolment and baseline data collection; a second visit one week later for additional baseline data collection, randomisation and intervention; a third visit 12 months after randomisation for 12 months data collection; and a fourth visit one week thereafter for additional 12 months data collection.

### Randomisation and blinding

A statistician blinded to study objectives and not involved in any study procedure or analysis created the randomisation sequence using Stata 12.0 (StataCorp, College Station, TX, USA) software. The sequence was stratified by centre with a 1:1 allocation to the Urban Training™ intervention or usual care groups using random block sizes of 6, 8 and 10. At the second study visit, a physiotherapist allocated patients to the corresponding group using a secured computer file, where allocations were ordered according to the randomisation sequence and only available one at a time.

Table S1 shows details on the blinding scheme. Outcome examiners and data analysts remained blinded to the allocation. The physiotherapists who administered the intervention and knew the allocated groups did not perform outcome measurements [6]. Patients were not aware of the existence of the alternative group, as approved by the Ethics Committees.

### Interventions

Both groups received the usual standardised pharmacological and/or non-pharmacological treatment for COPD, including pulmonary rehabilitation, to the discretion of their physician and without any intervention by the research team. We implemented diverse measures to avoid contamination (i.e., that participants did not receive the intervention to which they were randomised).

Usual care

Patients assigned to usual care group received general health counselling and were provided with the European Lung Foundation (ELF) information brochure of "Living an active life with COPD" which includes the recommendation to complete at least 30 min of moderate physical activity at least 5 days per week. This recommendation was considered ethically necessary and corresponds to appropriate clinical practice [7].

The Urban Training™ intervention

Patients assigned to the intervention group received the Urban Training™ intervention, always proposed as a supplement to the physical activities of patients' daily life and in no case as a substitute activity. The intervention consisted of the following six components (figure 2 of the main text):

(1) *Motivational interviewing.* At baseline (in the second visit), a respiratory physiotherapist adequately trained in behavioural strategies used motivational interviewing techniques [8], integrated with a stage-matched approach [9], for a maximum of one hour. The interview was centred on empathy, reflective listening, affirmation, and addressing patients' resistances (personal difficulties, barriers and limitations) to elicit a behavioural change. Information on the remaining components of the intervention (see below) was provided during this interview. During this interview, patients were questioned about their self-efficacy and motivation levels in a scale between 0 and 10. The physiotherapist identified the stage of change (pre-contemplation, contemplation, preparation, action, maintenance and relapse). During the follow-up period, the physiotherapist administered additional motivational 5-10 min phone calls at different frequencies depending on patients' baseline motivation and self-efficacy levels: patients with low motivation (score <8) were called at 15, 30, 60 and 180 days, patients with high motivation (score ≥8) but low self-efficacy (score <8) were called at 30, 60 and 180 days, and patients with high motivation and self-efficacy (both scores ≥8) at 180 days.

(2) *Urban Training™ walking trails.* During the motivational interview participants received a dossier containing various maps of walking trails from different areas according to their mobility options and preferences. The design and validation of such walking trails has been previously published [3]. Briefly, we designed walking trails of different intensities (low [green trail], moderate [orange trail] or high [red trail]) in walkable public spaces (boulevards, beaches and parks) of the five seaside municipalities included in the study by combining urban elements of varying intensity (stairs, ramps and different types of surfacing). A validation study showed that the physiological response to and energy expenditure on unsupervised walking these trails increased according to the predefined trails' intensity and did not change across trails of the same intensity in different public spaces. The physiotherapist provided a complete explanation of trails characteristics and instructed patients to train following the FITT principle (Frequency, Intensity, Time, and Type) [10]. Each patient was advised to start with a trail of intensity appropriate to his/her baseline dyspnoea and 6-min walk distance (6MWD), and instructed how to increase progressively the volume (number of walks per day on the same trail) and/or the intensity of the trails during the following 12 months according to their symptoms and motivation (figure S1). In all cases, the instructions were to walk at least one trail per day at least 5 days per week, at a pace reaching a dyspnoea Borg scale between 4 and 6 [11]. The physiotherapist also explained how to adjust exercise during and after exacerbation episodes.

(3) *Pedometer and calendar.* During the motivational interview, patients were provided with both a pedometer (Onstep 50 Geonaute and Omron) and a personalised calendar. Patients were trained to wear the pedometer all day, and particularly during walks. It was used to help patients monitor their physical activity, so they could maintain or increase their daily step number during the 12 months of follow-up. Patients were instructed to note in the calendar every evening the trails walked that specific day (sticking a green, orange or red colour sticker, depending on trail intensity) and the number of steps walked (according to the pedometer). The calendar was personalised to each patient by making a note about when a change in trails intensity was expected. Calendars also included educational and motivational information.

(4) *Brochures, website and phone text messages.* During the interview, patients also received the same European Lung Foundation information brochure as the usual care group. They were also provided with the link to the project website (http://www.entrenament-urba.cat/) which contains information about the research group, project, general counselling about physical activity, links to other relevant websites, group activity schedule, and a contact phone number. Finally, patients were requested to provide a personal cell phone number where they would receive phone text messages every 2 weeks with educational or motivational messages.

(5) *Walking group.* Once per month during the follow-up period patients could join a walking group for walking a trail accompanied by an experienced physical activity trainer. The schedule of each walking group was provided in the calendars, website and text messages.

(6) *Phone contact.* Patients were invited to telephone the physiotherapists for any questions related to the intervention or their physical activity practice if needed at any moment during follow-up.

**Procedures**

The study consisted of four visits carried out by trained technicians (figure 1 of the main text). At the first visit, all patients answered an interviewer-administered questionnaire, including data on socio-demographic variables, smoking status, dyspnoea (using the modified Medical Research Council scale [mMRC]), health-related quality of life by means of both the Clinical COPD Questionnaire (CCQ) and the COPD Assessment Test (CAT), anxiety and depression symptoms (by the Hospital Anxiety and Depression scale [HAD]), and cognitive impairment (by the Phototest). We also measured, following standardised procedures: functional exercise capacity using the 6-min walk distance (6MWD) test, body composition (weight, height, body mass index [BMI] and fat free mass index [FFMI]) by physical examination and bioelectrical impedance, and lung function ($FEV_1$ and FVC) by spirometry before and after

bronchodilator. We collected information on comorbidities, pharmacological therapy and the COPD exacerbations in the 12 months prior to recruitment from medical records. In the latter case, we obtained the number of exacerbations (defined as an acute worsening of respiratory symptoms that results in additional therapy) and their severity (moderate [ambulatory-treated] or severe [requiring emergency-room or hospital admission]).

During the same first visit, patients were provided a Dynaport accelerometer (McRoberts BV, The Hague, The Netherlands), previously validated for COPD patients [12, 13], to measure objectively physical activity. Patients were instructed to wear it for a week on the centre of lower back with an elastic strap. A valid physical activity measurement was defined as a minimum of 3 days with at least 8 h of wearing time within waking hours [14]. Of note, all patients fulfilled this criterion (median wearing days 7, range 3 to 7; median recording time 14.9 h, range 11.1 to 15 of 15 h maximum from 7 am to 10 pm; 2% and 98% of patients recorded one and two weekend days respectively).

The second visit was carried out after seven days. Patients brought the accelerometer and answered the Clinical-PROactive Physical Activity (C-PPAC) questionnaire to measure physical activity experience [15]. A physiotherapist allocated patients to the corresponding group and provided the corresponding interventions to both groups as detailed above. The physiotherapist also noted down patients' spontaneous report of unwillingness to follow the instructions (e.g. walking at least 5 days per week at least 30 min per day in the usual care group or walking the Urban Training™ trails in the Urban Training™ group).

At the third visit (12 months after randomisation), we obtained the same information as in the first visit, including the number and severity of exacerbations during the follow-up period. The accelerometer was given and patients returned it one week later (fourth visit). At this fourth visit, 6 patients out of 286 (2%) did not fulfil the criterion of wearing time per day. Among included patients, median wearing days was 7, range 4 to 7; median recording time 14.8 h, range 10.2 to 15; 4% and 96% of patients recorded one and two weekend days respectively. During this fourth visit, patients also answered a questionnaire about satisfaction with the study components and any potential adverse events actually experienced during or after walks in the previous 12 months (follow-up period) including: lower extremity joint pain; lower extremity muscle pain; general malaise or fatigue; dizziness; faint; dyspnoea; chest discomfort; palpitations; fall, twist or accident; cold, flu or pneumonia; and heatstroke or dehydration. Finally, the physiotherapist noted down patients' spontaneous report of not having followed the intervention instructions during the follow-up period.

Quality control consisted of centralised training sessions, rapid support and supervision of all fieldworkers, periodic recording and checking of questionnaires and tests to identify possible deviations from the protocol, double verification of case report forms, the double entry of data, and at least one visit to each of the participating centres during data collection.

**Study outcomes**

The primary outcome was the change in physical activity using the number of steps per day from baseline to 12 months follow-up. Secondary outcomes were having any severe COPD exacerbation (leading to hospital or emergency-room admission) during the 12 month follow-up; and the 12 month changes in functional exercise capacity by the 6MWD, body composition measured by BMI and FFMI, health-related quality of life by the CAT and CCQ total scores, and HAD-anxiety and -depression scores. Exploratory outcomes were the 12 month changes in cognitive impairment by the Phototest score and physical activity experience by the total, amount and difficulty C-PPAC scores.

**Statistical Analysis**

To detect a difference of 775 steps per day (primary outcome) between groups (based on previous research about the effects of behavioural interventions in the elderly) [16], with a two-sided $\alpha$=0.05 and a power of 80%, assuming a standard deviation of steps per day of 3000 and a correlation between baseline and final steps $\geq$0.7 (based on own data in COPD patients), a sample size of 142 patients per group was necessary. To account for a 30% drop out rate during follow-up, we planned to recruit 202 participants per group (404 in total). Calculations were done with the software GRANMO 7.10 [17].

Pre-specified efficacy and effectiveness were analysed with *per protocol* (PP) and intention to treat (ITT) analysis sets, respectively. The ITT analysis set was defined as all randomised patients who did not fulfil any of the following criteria: (i) withdrawn or lost to follow-up during the 12 month follow-up, (ii) death during the 12 month follow-up, (iii) appearance of an exclusion criterion between randomisation and 12 month visit, and (iv) inability to provide a valid record of physical activity. PP analysis set was defined as the subset of ITT who was classified as adherent to their corresponding intervention. Adherence was obtained from the interviews. We classified as 'non adherent' patients who (i) spontaneously reported at baseline that they were unwilling to follow any of the instructions, or (ii) spontaneously reported at the 12 months visit that they had not been adherent to the study protocol (see Procedures). Remaining patients were labelled as 'adherent'.

The characteristics of the usual care and intervention groups at baseline and at follow-up (both PP and ITT analysis sets) were reported as mean and SD for normal distributed quantitative variables, median and IQR for non-normal distributed variables, and number and percentage for qualitative variables. We compared characteristics between followed (ITT analysis set) and lost to follow-up patients using Student's t, Kruskal-Wallis or $chi^2$ tests. We compared characteristics of adherent (PP analysis set) and non adherent patients using Student's t, Kruskal-Wallis or $chi^2$ tests. We built a multivariable logistic regression model to identify the factors associated with adherence in our sample, considering all variables related to adherence in the bivariable analysis with p-value<0.1 and retaining the model with the highest Akaike information criterion (AIC).

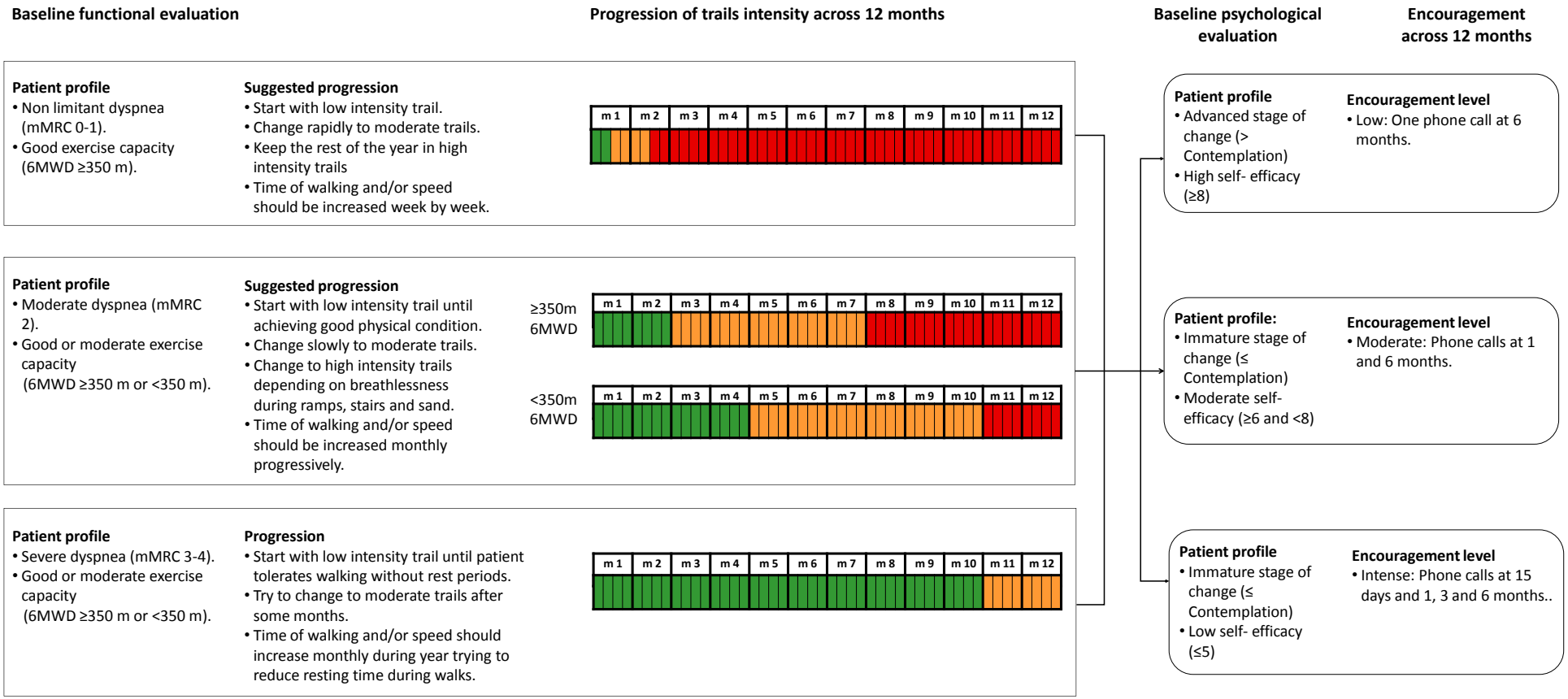
We compared baseline and 12 months values for each outcome and intervention group using paired Student's t or $chi^2$ tests. To test effectiveness, we built linear or logistic regression models, depending on the distribution of outcome variables. We used the change from baseline to 12 month follow-up as the outcome, the intervention group as the main exposure variable, and baseline levels of the corresponding outcome as a covariate (to account for individual differences in baseline levels). In efficacy analysis, we additionally adjusted for the variables related to adherence as covariates, since previous literature had shown this adjustment may reduce the selection bias produced by a differential distribution of the reasons that moved participants to be adherent [18, 19].

*Post hoc* analyses included stratification of efficacy results on physical activity (primary outcome) according to subgroups defined by baseline airflow limitation stages (mild-to-moderate *vs.* severe-to-very severe), functional exercise capacity (<500 *vs.* ≥500 m [median value] 6MWD), comorbidity (<2 *vs.* ≥2 in Charlson index) and physical activity levels (<7100 *vs.* ≥7100 baseline steps/day, a cut-off equivalent to being adherent to physical activity recommendations for older adults) [16]. All analyses were redone using repeated measures ANOVA instead of linear regression.

Safety analysis set included patients answering the adverse events questions at 12 months. Adverse events at 12 months were compared between groups using $chi^2$ or Fisher's exact tests.

All analyses were conducted with Stata 14.0 (StataCorp, College Station, TX, USA).

**Figure S1. Urban Training™ scheme to assign progression in trails intensity* and encouragement level during 12 months of follow-up.**




* Patients should increase progressively the volume (number of walks per day on the same trail) and/or the intensity of the trails (e.g., moving from low intensity trail to moderate intensity trail) according to their dyspnoea, exercise capacity and achievements, as agreed and recommended by an experienced and trained physiotherapist. The scheme will be appropriately adapted in patients with comorbidities or other personal limitations of any kind (functional, psychological, family issues, etc). Counsellors should also advice patients to reduce the volume and/or intensity of trails during and after exacerbation episodes.

**Table S1. Blinding of Urban Training™ personnel, according to the CONSORT recommendations for non-pharmacological trials**

| | Blinded to: | | | |
|---|---|---|---|---|
| | **Study hypotheses and objectives** | **Intervention details** | **Random assignment** | **Outcome measures** |
| Study participants | Yes | Partially[1] | Yes | Partially[3] |
| Participants' physicians | Yes[2] | Yes[2] | Yes | Partially[2,3] |
| Technicians (outcomes examiners) | Yes | Yes | Yes | No |
| Counsellors (physiotherapists) | No | No | No | Yes |
| Researchers | No | No | Yes | Partially[4] |
| Statisticians (data analysts) | No | Yes | Yes | Partially[4] |

[1] Patients were aware of their own intervention but not of the existence of the alternative group nor of the study objectives, as approved by the Ethics Committee.

[2] Health professionals taking care of the patients were blinded except if, by chance, a member of the research team was the physician of a patient involved in the study. According to these physicians, this situation happened in 10 (2%) patients.

[3] Outcomes information was provided to patients if they asked for it and sent to their physicians if patients asked for it. No information in the intervention or study objectives was included.

[4] Outcomes information was not available until the analysis phase.

**Table S2. Baseline characteristics of 407 randomised COPD patients.**

| | Usual care n=205* m (SD) / n (%) | Urban Training n=202* m (SD) / n (%) | All n=407* m (SD) / n (%) |
|---|---|---|---|
| Age (years) | 69 (8) | 69 (9) | 69 (9) |
| Female / male | 29 (14) / 176 (86) | 32 (16) / 170 (84) | 61 (15) / 346 (85) |
| Active smoker | 42 (20) | 56 (28) | 98 (24) |
| Low socio-economic status[†] | 148 (73) | 143 (71) | 291 (72) |
| Active worker | 20 (10) | 28 (14) | 48 (12) |
| Dyspnoea (mMRC grade, 0-4) | 1 (1) | 1 (1) | 1 (1) |
| Post-bronchodilator $FEV_1$ (% pred.) | 57 (18) | 56 (17) | 57 (18) |
| Post-bronchodilator $FEV_1$/FVC ratio | 0.55 (0.12) | 0.53 (0.11) | 0.54 (0.12) |
| Airflow limitation (% mild / moderate / severe / very severe)[‡] | 10 / 52 / 31 / 7 | 9 / 55 / 28 / 8 | 10 / 53 / 29 / 8 |
| GOLD 2017 assessment (% A / B / C / D)[‡] | 33 / 45 / 7 / 15 | 30 / 55 / 4 / 11 | 31 / 50 / 6 / 13 |
| Cardiovascular disease[¶] | 130 (64) | 124 (63) | 254 (64) |
| Diabetes mellitus[¶] | 53 (26) | 61 (31) | 114 (29) |
| Musculoskeletal diseases[¶] | 80 (39) | 74 (38) | 154 (39) |
| Charlson index, med (IQR) | 2 (1-3) | 2 (1-3) | 2 (1-3) |
| Inhaled corticosteroids (alone or in combination) | 116 (59) | 106 (55) | 222 (57) |
| Long acting bronchodilators (LAMA or LABA, alone or in combination) | 161 (82) | 160 (83) | 321 (82) |
| Steps (num/day) | 7605 (3859) | 7489 (4234) | 7547 (4045) |
| Any severe COPD exacerbation in previous 12 months | 33 (16) | 17 (9) | 50 (13) |
| 6MWD (m) | 486 (92) | 487 (98) | 486 (95) |
| BMI ($kg/m^2$) | 28.4 (4.9) | 28.5 (5.0) | 28.5 (4.9) |
| FFMI ($kg/m^2$) | 19.5 (3.2) | 19.6 (3.2) | 19.5 (3.2) |
| Health-related quality of life (CAT) | 12 (7) | 12 (7) | 12 (7) |
| Health-related quality of life (CCQ total), med (IQR) | 1 (1-2) | 1 (1-2) | 1 (1-2) |
| Anxiety (HAD-A), med (IQR) | 4 (2-8) | 4 (2-8) | 4 (2-8) |
| Depression (HAD-D), med IQR) | 2 (1-5) | 3 (1-5) | 2 (1-5) |
| Cognitive status (Phototest) | 36 (5) | 36 (5) | 36 (5) |
| Physical activity experience (C-PPAC Total) | 78 (12) | 77 (12) | 78 (12) |
| Physical activity amount (C-PPAC Amount) | 73 (16) | 73 (15) | 73 (16) |
| Physical activity difficulty (C-PPAC Difficulty) | 82 (14) | 81 (15) | 82 (15) |

SD: standard deviation; mMRC: modified medical research council; $FEV_1$: forced expiratory volume in the first second; FVC: forced vital capacity; GOLD: Global Initiative for Chronic Obstructive Lung Disease; IQR: interquartile range; LABA: long acting beta-agonist; LAMA: long-acting muscarinic antagonists; 6MWD: six minute walking distance; BMI: body mass index; FFMI: fat free mass index; CAT: COPD assessment test; CCQ: Clinical COPD Questionnaire; HAD: hospital anxiety and depression scale; C-PPAC: Clinical visit - PROactive Physical Activity in COPD (higher numbers indicate a better score).

* Some variables have missing values: 2 in socio-economic status, 13 in active worker, 11 in GOLD 2017, 7 in cardiovascular disease, diabetes and musculoskeletal disease, 7 in Charlson index, 17 in inhaled corticosteroids and long acting bronchodilators, 11 in severe COPD exacerbations, 39 in FFMI, 2 in CCQ score, 2 in HAD-anxiety, 4 in HAD-depression, and 96 in C-PPAC Total, 95 in C-PPAC Amount and 96 in C-PPAC Difficulty Scores.

[†] III, IV or V in the UK National Statistics Socio-economic classification.

[‡] COPD severity classified as: Mild: $FEV_1 \geq$ 80% pred.; moderate: $FEV_1$ 50 to 79% pred.; severe: $FEV_1$ 30 to 49% pred.; very severe: $FEV_1$ <30% pred.; and A: low risk, low symptoms burden; B: low risk, high symptoms burden; C: high risk, low symptoms burden; D: high risk, high symptoms burden.

[¶] Cardiovascular disease: ICD-10 I00-I99; Diabetes Mellitus: ICD10 E10-E14; Musculoskeletal diseases: ICD-10 M00-M99.

**Table S3. Differences between patients participating at 12 months and lost to follow-up.**

| | Followed n=280* m (SD) / n (%) | Lost to follow-up n=127* m (SD) / n (%) | p-value |
|---|---|---|---|
| Age (years) | 69 (8) | 69 (9) | 0.419 |
| Female / male | 36 (13) / 244 (87) | 25 (20) / 102 (80) | 0.074 |
| Active smoker | 64 (23) | 34 (27) | 0.392 |
| Low socio-economic status[†] | 200 (72) | 91 (72) | 0.952 |
| Active worker | 35 (13) | 13 (10) | 0.461 |
| Dyspnoea (mMRC grade, 0-4) | 1 (1) | 1 (1) | 0.053 |
| Post-bronchodilator $FEV_1$ (% pred.) | 57 (17) | 56 (18) | 0.655 |
| Post-bronchodilator $FEV_1$/FVC ratio | 0.54 (0.12) | 0.55 (0.12) | 0.606 |
| Airflow limitation severity (% mild / moderate / severe / very severe)[‡] | 10 / 53 / 31 / 6 | 10 / 55 / 25 / 10 | 0.403 |
| GOLD 2017 assessment (% A / B / C / D)[‡] | 34 / 48 / 5 / 13 | 26 / 55 / 6 / 13 | 0.481 |
| Any cardiovascular disease[¶] | 171 (61) | 83 (69) | 0.163 |
| Diabetes mellitus[¶] | 82 (29) | 32 (26) | 0.549 |
| Musculoskeletal diseases[¶] | 107 (38) | 47 (39) | 0.926 |
| Charlson index, med (IQR) | 2 (1-3) | 2 (1-3) | 0.910 |
| Inhaled corticosteroids (alone or in combination) | 150 (55) | 72 (62) | 0.182 |
| Long acting bronchodilators (LAMA/LABA, alone or in combination) | 225 (82) | 96 (83) | 0.879 |
| Steps (num/day) | 7918 (4190) | 6730 (3587) | <0.01 |
| Any severe COPD exacerbation in previous 12 months | 31 (11) | 19 (16) | 0.190 |
| 6MWD (m) | 500 (89) | 456 (102) | <0.001 |
| BMI ($kg/m^2$) | 28.4 (4.8) | 28.7 (5.3) | 0.562 |
| FFMI ($kg/m^2$) | 19.6 (3.1) | 19.5 (3.5) | 0.786 |
| Health-related quality of life (CAT) | 12 (7) | 12 (7) | 0.950 |
| Health-related quality of life (CCQ total), med (IQR) | 1 (1-2) | 1 (1-2) | 0.762 |
| Anxiety (HAD-A), med (IQR) | 4 (2-8) | 4 (2-8) | 0.906 |
| Depression (HAD-D), med (IQR) | 3 (1-5) | 2 (1-5) | 0.154 |
| Cognitive status (Phototest) | 36 (5) | 36 (6) | 0.639 |
| Physical activity experience (C-PPAC Total) | 78 (11) | 76 (13) | 0.066 |
| Physical activity experience of amount (C-PPAC Amount) | 75 (15) | 70 (17) | 0.036 |
| Physical activity experience of difficulty (C-PPAC Difficulty) | 82 (14) | 81 (16) | 0.424 |

SD: standard deviation; mMRC: modified medical research council; $FEV_1$: forced expiratory volume in the first second; FVC: forced vital capacity; GOLD: Global Initiative for Chronic Obstructive Lung Disease; IQR: interquartile range; LABA: long acting beta-agonist; LAMA: long-acting muscarinic antagonists; 6MWD: six minute walking distance; BMI: body mass index; FFMI: fat free mass index; CAT: COPD assessment test; CCQ: Clinical COPD Questionnaire; HAD: hospital anxiety and depression scale; C-PPAC: Clinical visit – PROactive Physical Activity in COPD (higher numbers indicate a better score).

* Some variables have missing values: 2 in socio-economic status, 13 in active worker, 11 in GOLD 2017, 7 in cardiovascular disease, diabetes and musculoskeletal disease, 7 in Charlson index, 17 in inhaled corticosteroids and long acting bronchodilators, 11 in severe COPD exacerbations, 39 in FFMI, 2 in CCQ score, 2 in HAD-anxiety, 4 in HAD-depression, and 96 in C-PPAC Total, 95 in C-PPAC Amount and 96 in C-PPAC Difficulty Scores.

[†] III, IV or V in the UK National Statistics Socio-economic classification.

[‡] COPD severity classified as: Mild: $FEV_1 \geq 80\%$ pred.; moderate: $FEV_1$ 50 to 79% pred.; severe: $FEV_1$ 30 to 49% pred.; very severe: $FEV_1$ <30% pred.; and A: low risk, low symptoms burden; B: low risk, high symptoms burden; C: high risk, low symptoms burden; D: high risk, high symptoms burden.

[¶] Cardiovascular disease: ICD-10 I00-I99; Diabetes Mellitus: ICD10 E10-E14; Musculoskeletal diseases: ICD-10 M00-M99.

**Table S4. Differences between patients participating at 12 months and lost to follow-up, by intervention group.**

| | Usual care | | | Urban Training | | |
|---|---|---|---|---|---|---|
| | **Followed** | **Lost to follow-up** | | **Followed** | **Lost to follow-up** | |
| | **n=148** | **n=57** | **p-value** | **n=132** | **n=70** | **p-value** |
| | **m (SD) / n (%)** | **m (SD) / n (%)** | | **m (SD) / n (%)** | **m (SD) / n (%)** | |
| Age (years) | 69 (8) | 69 (8) | 0.836 | 68 (9) | 70 (9) | 0.229 |
| Female / male | 18 (12) / 130 (88) | 11 (19) / (46 (81) | 0.189 | 18 (14) /114 (86) | 14 (20) / 56 (80) | 0.239 |
| Active smoker | 30 (20) | 12 (21) | 0.901 | 34 (26) | 22 (31) | 0.392 |
| Low socio-economic status[†] | 107 (73) | 41 (72) | 0.902 | 93 (71) | 50 (71) | 0.948 |
| Active worker | 16 (11) | 4 (7) | 0.600 | 19 (14) | 9 (13) | 0.764 |
| Dyspnoea (mMRC grade, 0-4) | 1 (1) | 1 (1) | 0.021 | 1 (1) | 1 (1) | 0.581 |
| Post-bronchodilator $FEV_1$ (% pred.) | 58 (18) | 55 (19) | 0.279 | 56 (17) | 57 (18) | 0.616 |
| Post-bronchodilator $FEV_1$/FVC ratio | 0.55 (0.12) | 0.55 (0.13) | 0.658 | 0.53 (0.11) | 0.54 (0.11) | 0.681 |
| Airflow limitation severity (% mild / moderate / severe / very severe)[‡] | 10 / 54 / 30 / 6 | 11 / 47 / 31 / 11 | 0.581 | 9 / 51 / 32 / 8 | 9 / 61 / 20 / 10 | 0.278 |
| GOLD 2017 assessment (% A / B / C / D)[‡] | 36 / 44 / 7 / 13 | 24 / 50 / 6 / 20 | 0.288 | 31 / 53 / 3 / 13 | 28 / 60 / 6 / 6 | 0.328 |
| Any cardiovascular disease[¶] | 90 (61) | 40 (73) | 0.116 | 81 (62) | 43 (65) | 0.649 |
| Diabetes mellitus[¶] | 38 (26) | 15 (27) | 0.818 | 44 (34) | 17 (26) | 0.262 |
| Musculoskeletal diseases[¶] | 56 (38) | 24 (44) | 0.452 | 51 (39) | 23 (35) | 0.576 |
| Charlson index, med (IQR) | 2 (1-3) | 2 (1-3) | 0.397 | 2 (1-3) | 2 (1-2) | 0.396 |
| Inhaled corticosteroids (alone or in combination) | 82 (55) | 34 (62) | 0.412 | 68 (52) | 38 (58) | 0.451 |
| Long acting bronchodilators (LAMA/LABA, alone or in combination) | 116 (78) | 45 (82) | 0.591 | 109 (83) | 51 (77) | 0.314 |
| Steps (num/day) | 7784 (3847) | 7143 (3885) | 0.288 | 8069 (4554) | 6395 (3315) | 0.007 |
| Any severe COPD exacerbation in previous 12 months | 21 (14) | 12 (22) | 0.178 | 10 (8) | 7 (11) | 0.473 |
| 6MWD (m) | 501 (83) | 447 (104) | <0.001 | 499 (95) | 464 (102) | 0.008 |
| BMI ($kg/m^2$) | 28.3 (4.6) | 28.8 (5.6) | 0.554 | 28.4 (5) | 28.6 (5) | 0.812 |
| FFMI ($kg/m^2$) | 19.6 (3.2) | 19.4 (3.5) | 0.706 | 19.6 (3.1) | 19.6 (3.5) | 0.978 |
| Health-related quality of life (CAT) | 12 (8) | 13 (6) | 0.797 | 12 (7) | 12 (7) | 0.873 |
| Health-related quality of life (CCQ total), med (IQR) | 1 (1-2) | 1 (1-2) | 0.917 | 1 (1-2) | 1 (1-2) | 0.711 |
| Anxiety (HAD-A), med (IQR) | 4 (2-8) | 4 (2-7) | 0.922 | 4 (2-8) | 5 (2-8) | 0.867 |
| Depression (HAD-D), med (IQR) | 3 (1-5) | 2 (1-6) | 0.830 | 3 (1-6) | 2 (1-4) | 0.087 |
| Cognitive status (Phototest) | 37 (5) | 36 (6) | 0.351 | 36 (5) | 37 (5) | 0.816 |
| Physical activity experience (C-PPAC Total) | 79 (12) | 76 (15) | 0.187 | 78 (11) | 76 (12) | 0.221 |
| Physical activity experience of amount (C-PPAC Amount) | 75 (15) | 70 (18) | 0.084 | 74 (15) | 71 (16) | 0.226 |
| Physical activity experience of difficulty (C-PPAC Difficulty) | 83 (13) | 82 (16) | 0.680 | 82 (15) | 80 (16) | 0.525 |

SD: standard deviation; mMRC: modified medical research council; $FEV_1$: forced expiratory volume in the first second; FVC: forced vital capacity; GOLD: Global Initiative for Chronic Obstructive Lung Disease; IQR: interquartile range; LABA: long acting beta-agonist; LAMA: long-acting muscarinic antagonists; 6MWD: six minute walking distance; BMI: body mass index; FFMI: fat free mass index; CAT: COPD assessment test; CCQ: Clinical COPD Questionnaire; HAD: hospital anxiety and depression scale; C-PPAC: Clinical visit – PROactive Physical Activity in COPD (higher numbers indicate a better score).

* Some variables have missing values: 2 in socio-economic status, 13 in active worker, 11 in GOLD 2017, 7 in cardiovascular disease, diabetes and musculoskeletal disease, 7 in Charlson index, 17 in inhaled corticosteroids and long acting bronchodilators, 11 in severe COPD exacerbations, 39 in FFMI, 2 in CCQ score, 2 in HAD-anxiety, 4 in HAD-depression, and 96 in C-PPAC Total, 95 in C-PPAC Amount and 96 in C-PPAC Difficulty Scores.
† III, IV or V in the UK National Statistics Socio-economic classification.
‡ COPD severity classified as: Mild: $FEV_1 \geq$ 80% pred.; moderate: $FEV_1$ 50 to 79% pred.; severe: $FEV_1$ 30 to 49% pred.; very severe: $FEV_1$ <30% pred.; and A: low risk, low symptoms burden; B: low risk, high symptoms burden; C: high risk, low symptoms burden; D: high risk, high symptoms burden.
¶ Cardiovascular disease: ICD-10 I00-I99; Diabetes Mellitus: ICD10 E10-E14; Musculoskeletal diseases: ICD-10 M00-M99.

**Table S5. Differences between adherent[#] and unwilling/non adherent[#] patients participating at 12 months.**

| | Adherent[#] n=233* m (SD) / n (%) | Unwilling / non adherent[#] n=47* m (SD) / n (%) | p-value |
|---|---|---|---|
| Age (years) | 69 (8) | 67 (9) | 0.288 |
| Female / male | 29 (12) / 204 (88) | 7 (15) / 40 (85) | 0.636 |
| Active smoker | 49 (21) | 15 (32) | 0.105 |
| Low socio-economic status[†] | 169 (73) | 31 (67) | 0.452 |
| Active worker | 29 (13) | 6 (13) | 0.994 |
| Dyspnoea (mMRC grade, 0-4) | 1 (1) | 1 (1) | 0.128 |
| Post-bronchodilator $FEV_1$ (% pred.) | 58 (17) | 53 (18) | 0.047 |
| Post-bronchodilator $FEV_1$/FVC ratio | 0.55 (0.12) | 0.51 (0.12) | 0.032 |
| Airflow limitation severity (% mild / moderate / severe / very severe) [‡] | 9 / 55 / 31 / 5 | 11 / 38 / 36 / 15 | 0.030 |
| GOLD 2017 assessment (% A / B / C / D)[‡] | 36 / 47 / 4 / 13 | 20 / 54 / 11 / 15 | 0.074 |
| Any cardiovascular disease[¶] | 140 (60) | 31 (66) | 0.471 |
| Diabetes mellitus[¶] | 62 (27) | 20 (43) | 0.030 |
| Musculoskeletal diseases[¶] | 85 (37) | 22 (47) | 0.191 |
| Charlson index, med (IQR) | 2 (1-3) | 2 (1-3) | 0.289 |
| Inhaled corticosteroids (alone or in combination) | 128 (56) | 22 (47) | 0.230 |
| Long acting bronchodilators (LAMA/LABA, alone or in combination) | 186 (82) | 39 (83) | 0.865 |
| Steps (num/day) | 8038 (3972) | 7321 (5143) | 0.285 |
| Any severe COPD exacerbation in previous 12 months | 24 (10) | 7 (15) | 0.343 |
| 6MWD (m) | 505 (81) | 472 (118) | 0.212 |
| BMI ($kg/m^2$) | 28.2 (4.5) | 29.0 (5.9) | 0.336 |
| FFMI ($kg/m^2$) | 19.5 (3.0) | 19.8 (3.6) | 0.676 |
| Health-related quality of life (CAT) | 12 (7) | 13 (7) | 0.223 |
| Health-related quality of life (CCQ total), med (IQR) | 1 (1-2) | 1 (1-2) | 0.112 |
| Anxiety (HAD-A), med (IQR) | 4 (2-7) | 5 (2-9) | 0.350 |
| Depression (HAD-D), med (IQR) | 2 (1-5) | 4 (2-7) | 0.040 |
| Cognitive status (Phototest) | 36 (5) | 37 (6) | 0.365 |
| Physical activity experience (C-PPAC Total) | 79 (11) | 76 (13) | 0.177 |
| Physical activity experience of amount (C-PPAC Amount) | 75 (14) | 72 (19) | 0.191 |
| Physical activity experience of difficulty (C-PPAC Difficulty) | 83 (14) | 81 (14) | 0.411 |

SD: standard deviation; mMRC: modified medical research council; $FEV_1$: forced expiratory volume in the first second; FVC: forced vital capacity; GOLD: Global Initiative for Chronic Obstructive Lung Disease; IQR: interquartile range; LABA: long acting beta-agonist; LAMA: long-acting muscarinic antagonists; 6MWD: six minute walking distance; BMI: body mass index; FFMI: fat free mass index; CAT: COPD assessment test; CCQ: Clinical COPD Questionnaire; HAD: hospital anxiety and depression scale; C-PPAC: Clinical visit - PROactive Physical Activity in COPD (higher numbers indicate a better score).

* Some variables have missing values: 2 in socio-economic status, 11 in active worker, 3 in GOLD assessment, 1 in cardiovascular disease, diabetes and musculoskeletal disease, 1 in Charlson index, 6 in inhaled corticosteroids and long acting bronchodilators, 3 in severe COPD exacerbations, 30 in FFMI, 2 in CCQ score, 2 in HAD-anxiety, 3 in HD-depression, and 60 in C-PPAC Total, 59 in Amount and 60 in Difficulty Scores.

[†] III, IV or V in the UK National Statistics Socio-economic classification.

[‡] COPD severity classified as: Mild: $FEV_1 \geq$ 80% pred.; moderate: $FEV_1$ 50 to79% pred.; severe: $FEV_1$ 30 to 49% pred.; very severe: $FEV_1$ <30% pred.; and A: low risk, low symptoms burden; B: low risk, high symptoms burden; C: high risk, low symptoms burden; D: high risk, high symptoms burden.

[¶] Cardiovascular disease: ICD-10 I00-I99; Diabetes Mellitus: ICD10 E10-E14; Musculoskeletal diseases: ICD-10 M00-M99.

[#] Adherence was obtained from the interviews. Patients who (i) spontaneously reported at baseline that they were unwilling to follow any of the instructions, or (ii) spontaneously reported at the 12 months visit that they had not been adherent to the study protocol (see Procedures). Remaining patients were labelled as 'adherent'.

**Table S6. Factors associated with adherence[#] (multivariable logistic regression model*).**

| | Adherent[#] OR (95% CI) | p-value |
|---|---|---|
| Active smoker | 0.50 (0.24 to 1.03) | 0.059 |
| Post-bronchodilator $FEV_1$/FVC ratio (per one percentual unit) | 1.04 (1.01 to 1.07) | 0.009 |
| Diabetes mellitus | 0.38 (0.19 to 0.75) | 0.006 |
| Depression (HAD-D) | 0.90 (0.82 to 1.00) | 0.040 |

* Model built considering all variables related with adherence with $p<0.1$ (see supplementary table 4) and keeping the model with the highest Akaike information criterion (AIC).

[#] Adherence was obtained from the interviews. Patients who (i) spontaneously reported at baseline that they were unwilling to follow any of the instructions, or (ii) spontaneously reported at the 12 months visit that they had not been adherent to the study protocol (see Procedures). Remaining patients were labelled as 'adherent'.

**Table S7. Use of and satisfaction with the study components.**

| | Usual care n=144 m (SD) | Urban Training n=126 m (SD) |
|---|---|---|
| Overall satisfaction with the study (0-10) | 9.1 (1.4) | 9.0 (1.5) |
| Confidence transmitted by the study staff (0-10) | 9.4 (1.0) | 9.6 (0.9) |
| Satisfaction with the time devoted by the study staff (0-10) | 9.3 (1.2) | 9.3 (1.1) |
| Satisfaction with the study staff willingness to listen (0-10) | 9.4 (1.0) | 9.5 (1.0) |
| Feeling to be in good hands (0-10) | 9.6 (0.8) | 9.7 (0.8) |
| Satisfaction with study organisation (0-10) | 9.4 (1.2) | 9.4 (1.0) |
| Information brochure | | |
| Use, n (%) | 81 (56) | 70 (56) |
| Satisfaction among users (0-10) | 8.9 (1.6) | 9.1 (1.1) |
| Trail maps | | |
| Use, n (%) | | 85 (70) |
| Satisfaction among users (0-10) | | 9.1 (1.6) |
| Satisfaction with instructions (0-10) | | 9.3 (1.3) |
| Calendar | | |
| Use, n (%) | | 109 (87) |
| Satisfaction among users (0-10) | | 9.1 (1.7) |
| Satisfaction with instructions (0-10) | | 9.5 (1.0) |
| Pedometer | | |
| Use, n (%) | | 113 (90) |
| Satisfaction among users (0-10) | | 9.0 (1.8) |
| Satisfaction with instructions (0-10) | | 9.6 (1.0) |
| Walking group | | |
| Participation, n (%) | | 39 (31) |
| Satisfaction among participants (0-10) | | 7.5 (2.8) |
| Phone text messaging | | |
| Reading them, n (%) | | 77 (61) |
| Satisfaction among users (0-10) | | 9.4 (1.0) |
| Study phone | | |
| Use, n (%) | | 52 (41) |
| Satisfaction with the phone among users (0-10) | | 9.5 (1.4) |
| Satisfaction with solutions provided among users (0-10) | | 9.7 (0.7) |
| Website | | |
| Use, n (%) | | 3 (2) |
| Satisfaction among users (0-10) | | 8.7 (2.3) |
| Satisfaction with instructions (0-10) | | 10 (0) |

SD: standard deviation

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