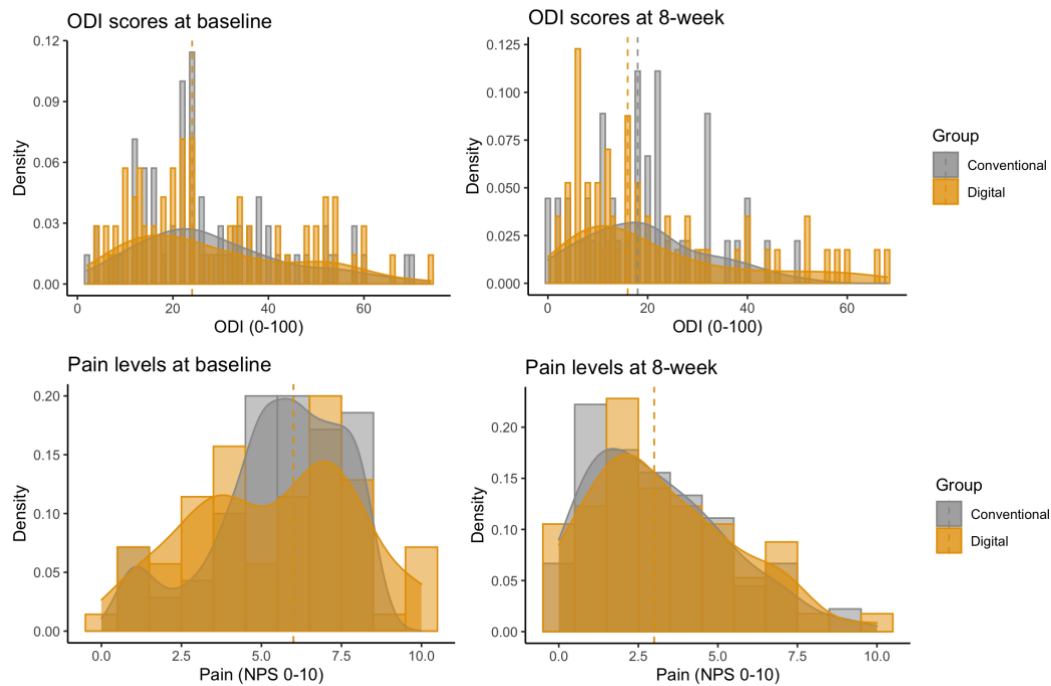


## SUPPLEMENTARY INFORMATION

**Supplementary Figure 1.** Histograms and normality tests to assess data distribution for disability (Oswestry Disability Index - ODI) and pain levels.



### Tests of Normality

|                        | Group        | Kolmogorov-Smirnov <sup>a</sup> |    |       | Shapiro-Wilk |    |       |
|------------------------|--------------|---------------------------------|----|-------|--------------|----|-------|
|                        |              | Statistic                       | df | Sig.  | Statistic    | df | Sig.  |
| ODI scores at baseline | Conventional | .079                            | 45 | .200* | .976         | 45 | .470  |
|                        | Digital      | .139                            | 57 | .008  | .927         | 57 | .002  |
| ODI scores at 8-week   | Conventional | .120                            | 45 | .109  | .965         | 45 | .194  |
|                        | Digital      | .184                            | 57 | <.001 | .863         | 57 | <.001 |

\*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

### Tests of Normality

|                         | Group        | Kolmogorov-Smirnov <sup>a</sup> |    |       | Shapiro-Wilk |    |      |
|-------------------------|--------------|---------------------------------|----|-------|--------------|----|------|
|                         |              | Statistic                       | df | Sig.  | Statistic    | df | Sig. |
| Pain levels at baseline | Conventional | .166                            | 45 | .003  | .915         | 45 | .003 |
|                         | Digital      | .152                            | 57 | .002  | .959         | 57 | .052 |
| Pain levels at 8-week   | Conventional | .157                            | 45 | .007  | .932         | 45 | .011 |
|                         | Digital      | .163                            | 57 | <.001 | .939         | 57 | .006 |

a. Lilliefors Significance Correction

**Supplementary Table 1. Baseline characteristics of study completers.**

| Characteristic                                                                             | Digital Group<br>(N=57) | Conventional Group<br>(N=45) | P*          |
|--------------------------------------------------------------------------------------------|-------------------------|------------------------------|-------------|
| Age (years), median (IQR)                                                                  | 47.00 (24.00)           | 59.00 (19.00)                | <b>.040</b> |
| Age categories, N (%):                                                                     |                         |                              | <b>.039</b> |
| <25                                                                                        | 1 (1.8)                 | 1 (2.2)                      |             |
| 25-40                                                                                      | 19 (33.3)               | 5 (11.1)                     |             |
| 41-60                                                                                      | 24 (42.1)               | 20 (44.4)                    |             |
| > 60                                                                                       | 13 (22.8)               | 19 (42.2)                    |             |
| Gender, N (%):                                                                             |                         |                              | .363        |
| Woman                                                                                      | 37 (64.9)               | 33 (73.3)                    |             |
| Man                                                                                        | 20 (35.1)               | 12 (26.7)                    |             |
| BMI, median (IQR)                                                                          | 28.06 (9.23)            | 28.48 (9.26)                 | .793        |
| BMI categories, N (%):                                                                     |                         |                              | .928        |
| Normal (18.5-25)                                                                           | 20 (35.1)               | 16 (35.6)                    |             |
| Overweight (>25-30)                                                                        | 17 (29.8)               | 11 (24.4)                    |             |
| Obese (>30-40)                                                                             | 16 (28.1)               | 14 (31.1)                    |             |
| Morbidly obese (>40)                                                                       | 4 (7.0)                 | 4 (8.9)                      |             |
| Race, N (%):                                                                               |                         |                              | .231        |
| Asian or Pacific Islander                                                                  | 10 (17.5)               | 5 (11.1)                     |             |
| Black or African American                                                                  | 18 (31.6)               | 21 (46.7)                    |             |
| Hispanic or Latino                                                                         | 3 (5.3)                 | 1 (2.2)                      |             |
| Native American or Alaskan Native                                                          | 0 (0.0)                 | 1 (2.2)                      |             |
| White or Caucasian                                                                         | 25 (43.9)               | 15 (33.3)                    |             |
| Multi-racial or biracial                                                                   | 0 (0.0)                 | 2 (4.4)                      |             |
| Prefer not to answer                                                                       | 1 (1.8)                 | 0 (0.0)                      |             |
| Education level, N (%):                                                                    |                         |                              | .816        |
| Not attended school                                                                        | 0 (0.0)                 | 0 (0.0)                      |             |
| Some high school                                                                           | 2 (3.5)                 | 0 (0.0)                      |             |
| High school graduate or GED                                                                | 3 (5.3)                 | 3 (6.7)                      |             |
| Some college (some community college, associate degree)                                    | 13 (22.8)               | 9 (20.0)                     |             |
| Four-year college degree or bachelor's degree                                              | 15 (26.3)               | 12 (26.7)                    |             |
| Some post-graduate or professional schooling, no postgraduate degree                       | 4 (7.0)                 | 5 (11.1)                     |             |
| Postgraduate or professional degree (including master's, doctorate, medical or law degree) | 20 (35.1)               | 16 (35.6)                    |             |
| Prefer not to answer                                                                       | 0 (0.0)                 | 0 (0.0)                      |             |
| Employment status, N (%):                                                                  |                         |                              | .497        |
| Employed (part-time or full-time)                                                          | 38 (66.7)               | 30 (66.7)                    |             |
| Unemployed (seeking opportunities)                                                         | 7 (12.3)                | 2 (4.4)                      |             |
| Not employed                                                                               | 11 (19.3)               | 12 (26.7)                    |             |
| Prefer not to answer                                                                       | 1 (1.8)                 | 1 (2.2)                      |             |
| Exercise levels, N (%):                                                                    |                         |                              | .152        |
| None                                                                                       | 5 (8.8)                 | 7 (15.6)                     |             |
| Less than 1 hour                                                                           | 18 (31.6)               | 7 (15.6)                     |             |

|                                                |           |           |      |
|------------------------------------------------|-----------|-----------|------|
| Between 1-2.5 hours                            | 16 (28.1) | 19 (42.2) |      |
| >2.5 hours                                     | 18 (31.6) | 12 (26.7) |      |
| Comorbidities, N (%):                          |           |           |      |
| High blood pressure                            | 18 (31.6) | 15 (33.3) | .851 |
| High blood sugar or diabetes                   | 6 (10.5)  | 4 (8.9)   | .782 |
| Cardiac conditions                             | 3 (5.3)   | 1 (2.2)   | .432 |
| Respiratory conditions                         | 8 (14.0)  | 7 (15.6)  | .830 |
| None of the listed                             | 32 (56.1) | 24 (53.3) | .777 |
| Smoking habits, N (%):                         | 1 (1.8)   | 0 (0.0)   | .372 |
| Low back-related leg pain, N (%):              | 28 (49.1) | 26 (57.8) | .385 |
| Laterality of leg pain, N (%):                 |           |           | .884 |
| Right                                          | 10 (35.7) | 11 (42.3) |      |
| Left                                           | 12 (42.9) | 10 (38.5) |      |
| Both                                           | 6 (21.4)  | 5 (19.2)  |      |
| Lumbar radicular pain, N (%):                  | 18 (31.6) | 18 (40.0) | .377 |
| Previous physiotherapy, N (%):                 | 30 (52.6) | 25 (55.6) | .769 |
| Previous or scheduled low back surgery, N (%): | 5 (8.8)   | 3 (6.7)   | .695 |

Abbreviations: BMI, Body mass index; GED, General Educational Development (includes technical or vocational training).

\*Mann–Whitney U test or Pearson Chi-Square; Note: Significant p-values are presented in bold.

**Supplementary Table 2. Baseline characteristics between study completers (N=102) and non-completers (N=38).**

| Characteristic                                                                             | Completers<br>(N=102) | Non-completers<br>(N=38) | P*                |
|--------------------------------------------------------------------------------------------|-----------------------|--------------------------|-------------------|
| Age (years), median (IQR)                                                                  | 52.09 (14.27)         | 50.50 (14.74)            | .563 <sup>§</sup> |
| Age categories, N (%):                                                                     |                       |                          | .373              |
| <25                                                                                        | 2 (2.0)               | 3 (7.9)                  |                   |
| 25-40                                                                                      | 24 (23.5)             | 7 (18.4)                 |                   |
| 41-60                                                                                      | 44 (43.1)             | 17 /44.7)                |                   |
| > 60                                                                                       | 32 (31.4)             | 11 (28.9)                |                   |
| Gender, N (%):                                                                             |                       |                          | .749              |
| Woman                                                                                      | 70 (68.6)             | 25 (65.8)                |                   |
| Man                                                                                        | 32 (31.4)             | 13 (34.2)                |                   |
| BMI, median (IQR)                                                                          | 28.22 (8.98)          | 29.03 (7.74)             | .383 <sup>#</sup> |
| BMI categories, N (%):                                                                     |                       |                          |                   |
| Normal (18.5-25)                                                                           | 36 (35.3)             | 6 (15.8)                 | .151              |
| Overweight (>25-30)                                                                        | 28 (27.5)             | 15 (39.5)                |                   |
| Obese (>30-40)                                                                             | 30 (29.4)             | 14 (36.8)                |                   |
| Morbidly obese (>40)                                                                       | 8 (7.8)               | 3 (7.9)                  |                   |
| Race, N (%):                                                                               |                       |                          | .179              |
| Asian or Pacific Islander                                                                  | 15 (14.7)             | 2 (5.3)                  |                   |
| Black or African American                                                                  | 39 (38.2)             | 22 (57.9)                |                   |
| Hispanic or Latino                                                                         | 4 (3.9)               | 1 (2.6)                  |                   |
| Native American or Alaskan Native                                                          | 1 (1.0)               | 0 (0.0)                  |                   |
| White or Caucasian                                                                         | 40 (39.2)             | 11 (28.9)                |                   |
| Multi-racial or biracial                                                                   | 2 (2.0)               | 0 (0.0)                  |                   |
| Prefer not to answer                                                                       | 0 (0.0)               | 2 (5.3)                  |                   |
| Education level, N (%):                                                                    |                       |                          | <b>.012</b>       |
| Not attended school                                                                        | 0 (0.0)               | 1 (2.6)                  |                   |
| Some high school                                                                           | 2 (2.0)               | 2 (5.3)                  |                   |
| High school graduate or GED                                                                | 6 (5.9)               | 6 (15.8)                 |                   |
| Some college (some community college, associate degree)                                    | 22 (21.6)             | 14 (36.8)                |                   |
| Four-year college degree or bachelor's degree                                              | 27 (26.5)             | 4 (10.5)                 |                   |
| Some post-graduate or professional schooling, no postgraduate degree                       | 9 (8.8)               | 1 (2.6)                  |                   |
| Postgraduate or professional degree (including master's, doctorate, medical or law degree) | 36 (35.3)             | 9 (23.7)                 |                   |
| Prefer not to answer                                                                       | 0 (0.0)               | 1 (2.6)                  |                   |
| Employment status, N (%):                                                                  |                       |                          | .912              |
| Employed (part-time or full-time)                                                          | 68 (66.7)             | 26 (68.4)                |                   |
| Unemployed (seeking opportunities)                                                         | 9 (8.8)               | 2 (5.3)                  |                   |
| Not employed                                                                               | 23 (22.5)             | 9 (23.7)                 |                   |
| Prefer not to answer                                                                       | 2 (2.0)               | 1 (2.6)                  |                   |

|                                                |           |           |              |
|------------------------------------------------|-----------|-----------|--------------|
| Exercise levels, N (%):                        |           |           | <b>0.032</b> |
| None                                           | 12 (11.8) | 12 (31.6) |              |
| Less than 1 hour                               | 25 (24.5) | 8 (21.1)  |              |
| Between 1-2.5 hours                            | 35 (34.3) | 7 (18.4)  |              |
| >2.5 hours                                     | 30 (29.4) | 11 (28.9) |              |
| Comorbidities, N (%):                          |           |           |              |
| High blood pressure                            | 33 (32.4) | 14 (36.8) | .617         |
| High blood sugar or diabetes                   | 10 (9.8)  | 6 (15.8)  | .322         |
| Cardiac conditions                             | 4 (3.9)   | 3 (7.9)   | .337         |
| Respiratory conditions                         | 15 (14.7) | 5 (13.2)  | .816         |
| None of the listed                             | 56 (54.9) | 19 (50.0) | .605         |
| Smoking habits, N (%):                         | 1 (1.0)   | 3 (7.9)   | <b>.029</b>  |
| Low back-related leg pain, N (%):              | 54 (52.9) | 21 (55.3) | .806         |
| Laterality of leg pain, N (%):                 |           |           | .214         |
| Right                                          | 21 (38.9) | 8 (38.1)  |              |
| Left                                           | 22 (40.7) | 5 (23.8)  |              |
| Both                                           | 11 (20.4) | 8 (38.1)  |              |
| Lumbar radicular pain, N (%):                  | 36 (35.3) | 8 (21.1)  | .106         |
| Previous physiotherapy, N (%):                 | 55 (53.9) | 20 (52.6) | .892         |
| Previous or scheduled low back surgery, N (%): | 8 (7.8)   | 7 (18.4)  | .072         |

Abbreviations: BMI, Body mass index; GED, General Educational Development (includes technical or vocational training).

\*Pearson Chi-Square; §Independent samples t-test; #Mann–Whitney U test

Note: Significant p-values are presented in bold.

**Supplementary Table 3. Outcomes changes between baseline and 8-weeks: per-protocol analysis (N=102).**

| Outcome Variables       | N  | Digital Group | N  | Conventional Group | Estimate difference between groups <sup>§</sup> | P*   |
|-------------------------|----|---------------|----|--------------------|-------------------------------------------------|------|
| ODI                     |    |               |    |                    |                                                 |      |
| Baseline                | 57 | 24.0 (23.7)   | 45 | 24.0 (18.9)        | -0.67 (-8.00; 4.00)                             | .762 |
| 8 weeks                 | 57 | 16.0 (22.6)   | 45 | 18.0 (16.2)        | 0.00 (-5.78; 5.11)                              | .922 |
| Change baseline-8 weeks | 57 | -4.0 (8.0)    | 45 | -2.9 (11.7)        | 0.00 (-3.78; 4.00)                              | .879 |
| Pain Level              |    |               |    |                    |                                                 |      |
| Baseline                | 57 | 6.0 (4.0)     | 45 | 5.0 (3.0)          | 0.00 (-1.00; 1.00)                              | .921 |
| 8 weeks                 | 57 | 3.0 (4.0)     | 45 | 3.0 (3.0)          | 0.00 (-1.00; 1.00)                              | .698 |
| Change baseline-8 weeks | 57 | -2.0 (4.0)    | 45 | -2.0 (4.0)         | 0.00 (-1.00; 1.00)                              | .641 |
| Surgery Intent          |    |               |    |                    |                                                 |      |
| Baseline                | 57 | 0.0 (4.0)     | 45 | 0.0 (8.0)          | 0.00 (0.00; 0.00)                               | .717 |
| 8 weeks                 | 57 | 0.0 (3.0)     | 45 | 0.0 (1.0)          | 0.00 (0.00; 0.00)                               | .222 |
| Change baseline-8 weeks | 57 | 0.0 (1.0)     | 45 | 0.0 (0.0)          | 0.00 (0.00; 0.00)                               | .375 |
| FABQ-PA                 |    |               |    |                    |                                                 |      |
| Baseline                | 57 | 15.0 (5.0)    | 45 | 13.00 (9.00)       | -1.00 (-4.00; 1.00)                             | .395 |
| 8 weeks                 | 57 | 11.0 (7.0)    | 45 | 13.0 (7.0)         | -1.00 (-4.00; 1.00)                             | .198 |
| Change baseline-8 weeks | 57 | -1.0 (7.0)    | 45 | -2.0 (6.0)         | 0.00 (-2.00; 2.00)                              | .774 |
| GAD-7                   |    |               |    |                    |                                                 |      |
| Baseline                | 57 | 4.0 (6.0)     | 45 | 4.0 (6.0)          | 0.00 (-2.00; 1.00)                              | .708 |
| 8 weeks                 | 57 | 3.0 (6.0)     | 45 | 2.0 (4.0)          | 0.00 (-2.00; 0.00)                              | .324 |
| Change baseline-8 weeks | 57 | 0.0 (3.0)     | 45 | -1.0 (3.0)         | 0.00 (-1.00; 1.00)                              | .472 |
| PHQ-9                   |    |               |    |                    |                                                 |      |
| Baseline                | 57 | 4.0 (5.0)     | 45 | 3.0 (6.0)          | 0.00 (-2.00; 1.00)                              | .564 |
| 8 weeks                 | 57 | 3.0 (5.0)     | 45 | 2.0 (5.0)          | 0.00 (-2.00; 0.00)                              | .242 |
| Change baseline-8 weeks | 57 | 0.0 (3.0)     | 45 | -1.0 (4.0)         | 0.00 (-2.00; 1.00)                              | .344 |
| WPAI Overall            |    |               |    |                    |                                                 |      |
| Baseline                | 36 | 20.0 (25.2)   | 32 | 20.0 (38.6)        | 0.00 (-10.00; 9.72)                             | .478 |
| 8 weeks                 | 35 | 10.0 (20.0)   | 31 | 0.0 (36.4)         | 0.00 (0.00; 10.00)                              | .605 |
| Change baseline-8 weeks | 32 | -10.0 (29.3)  | 31 | 0.0 (30.0)         | 10.00 (0.00; 20.00)                             | .112 |
| WPAI Work               |    |               |    |                    |                                                 |      |
| Baseline                | 35 | 20.0 (20.0)   | 31 | 20.0 (40.0)        | 0.00 (-10.00; 10.00)                            | .656 |
| 8 weeks                 | 35 | 10.0 (20.0)   | 30 | 0.0 (30.0)         | 0.00 (0.00; 10.00)                              | .655 |
| Change baseline-8 weeks | 31 | -10.0 (20.0)  | 29 | 0.0 (25.0)         | 10.00 (0.00; 1.00)                              | .171 |
| WPAI Time               |    |               |    |                    |                                                 |      |
| Baseline                | 35 | 0 (0)         | 31 | 0 (0)              | 0.00 (0.00; 0.00)                               | .419 |
| 8 weeks                 | 35 | 0 (0)         | 31 | 0 (0)              | 0.00 (0.00; 0.00)                               | .487 |
| Change baseline-8 weeks | 31 | 0 (0)         | 31 | 0 (0)              | 0.00 (0.00; 0.00)                               | .488 |
| WPAI Activity           |    |               |    |                    |                                                 |      |
| Baseline                | 57 | 40.0 (40.0)   | 45 | 30.0 (40.0)        | 0.00 (-10.00; 10.00)                            | .391 |
| 8 weeks                 | 57 | 20.0 (30.0)   | 45 | 20.0 (40.0)        | 0.00 (-10.00; 10.00)                            | .795 |
| Change baseline-8 weeks | 57 | -10.0 (25.0)  | 45 | -10.0 (30.0)       | 0.00 (-10.00; 10.00)                            | .715 |

Abbreviations: FABQ-PA, Fear-avoidance beliefs questionnaire for physical activity; GAD-7, Generalized Anxiety Disorder 7-item scale; ODI, Oswestry Disability Index; PHQ-9, Patient Health 9-item questionnaire; WPAI, Work Productivity and Activity Impairment Questionnaire.

\*Mann-Whitney U test; §Hodges-Lehman estimator.

**Supplementary Table 4. Adverse events.**

| Adverse Event                                              | Start Date | Stop date  | Severity | Relationship to Study Intervention | Action taken with study treatment | Outcome of AE                | Expected | Serious |
|------------------------------------------------------------|------------|------------|----------|------------------------------------|-----------------------------------|------------------------------|----------|---------|
| Digital Group                                              |            |            |          |                                    |                                   |                              |          |         |
| Brain bleeding                                             | 20/10/2021 | 15/12/2021 | Severe   | Not related                        | None                              | Unknown                      | No       | No      |
| Spine Procedure - lumbar medial branch block               | 15/10/2021 | -          | Moderate | Unlikely related                   | Other                             | Ongoing/Continuing treatment | No       | No      |
| Development of chest pain with visit to the emergency room | 11/11/2021 | 15/11/2021 | Moderate | Not related                        | None                              | Resolved                     | No       | No      |
| Fall (pain prevented walking)                              | 13/01/2022 | 20/01/2022 | Mild     | Unlikely related                   | Intervention discontinued         | Ongoing/Continuing treatment | No       | No      |
| Knee pain (no concrete cause)                              | 25/11/2021 | 29/11/2021 | Moderate | Unlikely related                   | None                              | Resolved                     | No       | No      |
| COVID-19 infection                                         | 25/12/2021 | 19/01/2022 | Mild     | Not related                        | Change of treatment program       | Resolved                     | No       | No      |
| Low back worsening pain                                    | 23/01/2022 | -          | Mild     | Unlikely related                   | Change of treatment program       | Resolved                     | No       | No      |
| Arm cyst (urgent care needed)                              | 20/01/2022 | -          | Mild     | Not related                        | Other                             | Ongoing/Continuing treatment | No       | No      |
| Foot swelling                                              | 04/03/2022 | -          | Mild     | Not related                        | Other                             | Resolved                     | No       | No      |
| Lumbar spinal injection reaction                           | 01/07/2022 | 11/07/2022 | Moderate | Not related                        | Change of treatment program       | Resolved                     | No       | No      |

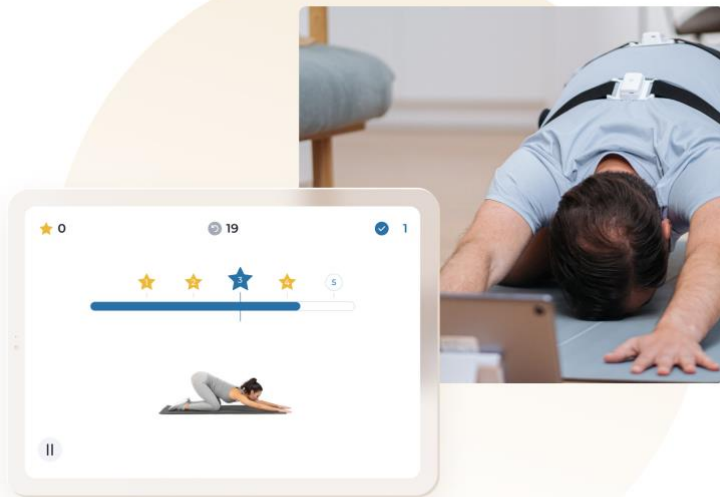
|                                |            |            |          |                  |                             |                              |    |    |
|--------------------------------|------------|------------|----------|------------------|-----------------------------|------------------------------|----|----|
| Fall (injured upper extremity) | 28/07/2022 | -          | Mild     | Unlikely related | Change of treatment program | Ongoing/Continuing treatment | No | No |
| Conventional Group             |            |            |          |                  |                             |                              |    |    |
| Ankle sprain                   | 09/07/2021 | -          | Mild     | Not related      | None                        | Unknown                      | No | No |
| Low back worsening pain        | 03/09/2021 | -          | Moderate | Unlikely related | Other                       | Ongoing/Continuing treatment | No | No |
| Struck by car                  | 12/02/2022 | -          | Moderate | Not related      | Change of treatment program | Resolved                     | No | No |
| Fall                           | 12/02/2022 | -          | Mild     | Not related      | None                        | Resolved                     | No | No |
| Cold sickness                  | 18/01/2022 | 31/01/2022 | Mild     | Not related      | None                        | Resolved                     | No | No |
| Low back injury after moving   | 30/07/2022 | -          | Moderate | Not related      | None                        | Resolved                     | No | No |



**Supplementary Table 5. Description of the exercise prescription in the digital group.**

| Phases and Main goals                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Intervention description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Initial Phase</p> <p>Goals:</p> <ul style="list-style-type: none"> <li>• Decrease symptoms intensity/severity and inflammatory signs</li> <li>• Gradual exposure to avoided movements</li> <li>• Increase trust in movement</li> <li>• Improve range of motion (passive and active)</li> <li>• Improve muscular strength and endurance</li> <li>• Improve motor control and stability</li> <li>• Provide knowledge on the condition, contributing factors and the role of exercise</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <p>Aim for at least 1-2 sets of:</p> <ul style="list-style-type: none"> <li>• Articular mobility exercises (e.g. sitting trunk flexion; combined trunk flexion and rotation; lower limb and pelvic mobility)</li> <li>• Strengthening exercises (e.g. squat, bridges)</li> <li>• Active and passive stretching exercises (e.g. sitting posterior thigh stretch)</li> </ul>                                                                                                                                                                                                                                                                                           |
| <p>Intermediate Phase</p> <p>Goals:</p> <ul style="list-style-type: none"> <li>• Symptoms control</li> <li>• Improve range of motion (passive and active)</li> <li>• Increase global muscular and aerobic capacity</li> <li>• Increase time of exposure to painful movements</li> <li>• Gradual exposure to daily activities that elicit symptoms</li> <li>• Integrate patient's knowledge and self-management skills into daily routine</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <p>Increase repetitions and sets or add external load (bands and/or free weights) of the prescribed exercises; Add more demanding exercises</p> <p>Progressively increase average session time</p> <p>Add neural glide exercises (eg. straight leg raises)</p> <p>Increase exercise complexity and aim for at least 2-3 sets of:</p> <ul style="list-style-type: none"> <li>• Articular mobility exercises (e.g. standing trunk movements)</li> <li>• Strengthening exercises (e.g. isometric wall squat, prone press-ups; plank; abdominal strengthening exercises)</li> <li>• Active and passive stretching exercises (standing anterior thigh stretch)</li> </ul> |
| <p>Late Phase</p> <p>Goals:</p> <ul style="list-style-type: none"> <li>• Functional restoration of range of motion</li> <li>• Return to daily activities</li> <li>• Increase time of exposure to daily activities that elicit symptoms</li> <li>• Exposure to more demanding daily activities</li> <li>• Continue to improve physical fitness</li> <li>• Foster independent symptom management</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <p>Add or increase external load of prescribed exercises (bands and/or free weights)</p> <p>Increase complexity and add single leg stance exercises:</p> <ul style="list-style-type: none"> <li>• Articular mobility exercises (e.g. single leg knee to chest)</li> <li>• Strengthening exercises (e.g. plank with trunk movement or with hand movement; lunges)</li> <li>• Active and controlled stretching exercises</li> </ul>                                                                                                                                                                                                                                    |
| <p>Notes:</p> <p>In addition to anamnesis, physical assessment comprised the evaluation of movement patterns, addressing compensations/difficulties during movements executions, and active and passive range of motion in uni-joint and multi-joint movements (measured by the motion trackers in the medical device).</p> <p>The exercise prescription was tailored according to the initial assessment and individual patient progress during the study.</p> <p>The following parameters of the exercise prescription were adjusted by the physical therapist according to the patient's evolution: range of motion, number of exercises, number of sets and repetitions and the type of exercise. Alongside assessment and communication between patients and PT, the performance (namely the range of motion, execution, movement compensations and skipped exercises) and the level of pain and fatigue during exercises reported by the patient were taken in consideration for the intervention decision making.</p> <p>Lower limb and neural glide exercises were prioritized in the presence of radicular pain.</p> <p>All necessary adjustments to the protocols were registered. Deviations from protocol required the provision of a clinical justification by the DPT, which was audited by the study PI.</p> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |

**Supplementary Figure 2.** Biofeedback system provided to each participant, composed of 2 motion trackers and a tablet with a dedicated App displaying the prescribed exercise sessions.



**Supplementary Table 6. Description of exercise prescription in the conventional group.**

| Stages and Main Goals                                                                                                                                                                                                                                                                                                                                                                                                       | Intervention Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Initial Phase</p> <p>Goals:</p> <ul style="list-style-type: none"> <li>• Decrease symptoms intensity/severity and inflammatory signs</li> <li>• Gradually exposure to avoided movements</li> <li>• Improve range of motion (passive and active)</li> <li>• Improve muscular strength and neuromuscular control</li> <li>• Functional activity modification and exposure</li> </ul>                                       | <p>Aim for 2-4 sets of exercises, including:</p> <ul style="list-style-type: none"> <li>• Articular mobility exercises (e.g. lumbar rotation in hook-lying, prone extension)</li> <li>• Active and passive stretches (e.g. gluteus/piriformis stretch, quadriceps stretch)</li> <li>• Strengthening exercises (e.g. wall slides, bridges, quadruped opposite arm and leg extension, plank, abdominal strengthening)</li> </ul>                                                                                   |
| <p>Late Phase</p> <p>Goals:</p> <ul style="list-style-type: none"> <li>• Return to daily activities</li> <li>• Functional restoration of range of motion</li> <li>• Return to activities of daily living</li> <li>• Improve overall condition</li> </ul>                                                                                                                                                                    | <p>Increase exercise dosage (through repetitions and sets) and complexity, and add external load (bands and/or free weights):</p> <ul style="list-style-type: none"> <li>• Articular mobility exercises (e.g. single leg knee to chest)</li> <li>• Strengthening exercises (e.g. single leg bridges, prone opposite arm and leg extension on a balance ball, side plank, unsupported dead bugs)</li> <li>• Active and passive stretches</li> </ul> <p>Include additional sports/activity specific exercises.</p> |
| <p>Notes:</p> <p>The exercise prescription was individualized according to the initial evaluation (including patient's symptoms and baseline physical capabilities) and the individual progress during the study. Gradual progressions on exercise dosage (sets, repetitions and intensity) were performed according to the patient's tolerance. Patients were instructed to continue to perform the exercises at home.</p> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |