Influencing walking behavior can increase the physical activity of patients with chronic pain hospitalized for multidisciplinary rehabilitation: an observational study

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Supplementary Figures and Tables

Model 1: Moderate-to-vigorous physical activity at home and at the rehabilitation clinic

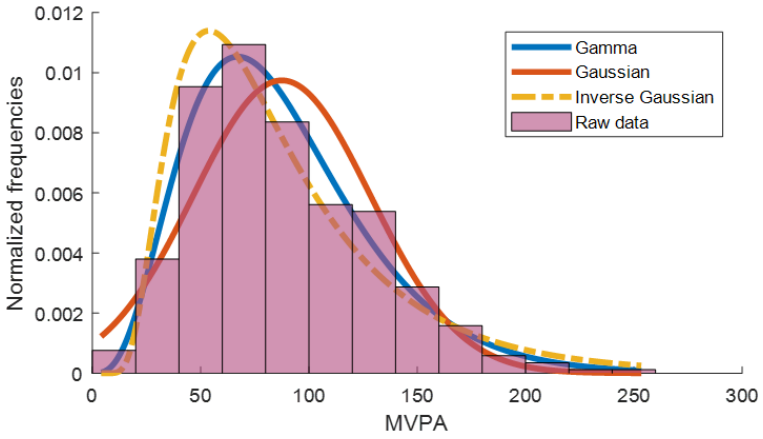

Figure S1. MVPA Histogram. *Normalized frequencies as a function of MVPA and best-fit curves for Gamma, Gaussian and Inverse Gaussian distributions. N= 855 days.*

Table S1. Matlab output of Model 1.

```
mdl=fitglme(data,'MVPA ~ 1 + Day_type +
(Day_type|Subject)','Distribution','Gamma','link','log','FitMethod','REMPL');


Generalized linear mixed-effects model fit by PL

Model information:
    Number of observations             855
    Fixed effects coefficients           4
    Random effects coefficients        372
    Covariance parameters               11
    Distribution                    Gamma
    Link                            Log
    FitMethod                       REMPL

Formula:
    MVPA ~ 1 + Day_type + (1 + Day_type | Subject)

Model fit statistics:
    AIC       BIC       LogLikelihood    Deviance
    816.73    887.93    -393.37          786.73

Fixed effects coefficients (95% CIs):
    Name                Estimate    SE          tStat     DF     pValue        Lower       Upper
    '(Intercept)'         4.174     0.058212    71.702    851           0      4.0597      4.2882
    'Day_type_2'        0.15531     0.038882    3.9945    851    7.044e-05    0.078997    0.23163
    'Day_type_3'        0.12437     0.048288    2.5756    851     0.010176    0.029591    0.21914
    'Day_type_4'        0.38848     0.058894    6.5963    851    7.401e-11     0.27289    0.50408

Random effects covariance parameters:
Group: Subject (93 Levels)
    Name1               Name2               Type          Estimate
    '(Intercept)'       '(Intercept)'       'std'           0.48213
    'Day_type_2'        '(Intercept)'       'corr'         -0.64506
    'Day_type_3'        '(Intercept)'       'corr'         -0.73858
    'Day_type_4'        '(Intercept)'       'corr'         -0.81103
    'Day_type_2'        'Day_type_2'        'std'           0.18637
    'Day_type_3'        'Day_type_2'        'corr'        -0.030467
    'Day_type_4'        'Day_type_2'        'corr'          0.21964
    'Day_type_3'        'Day_type_3'        'std'           0.18957
    'Day_type_4'        'Day_type_3'        'corr'          0.81085
    'Day_type_4'        'Day_type_4'        'std'           0.44055

Group: Error
    Name                        Estimate
    'sqrt(Dispersion)'          0.30944
```

Model 2: Univariable GLMM for day type effects on moderate-to-vigorous physical activity (MVPA)

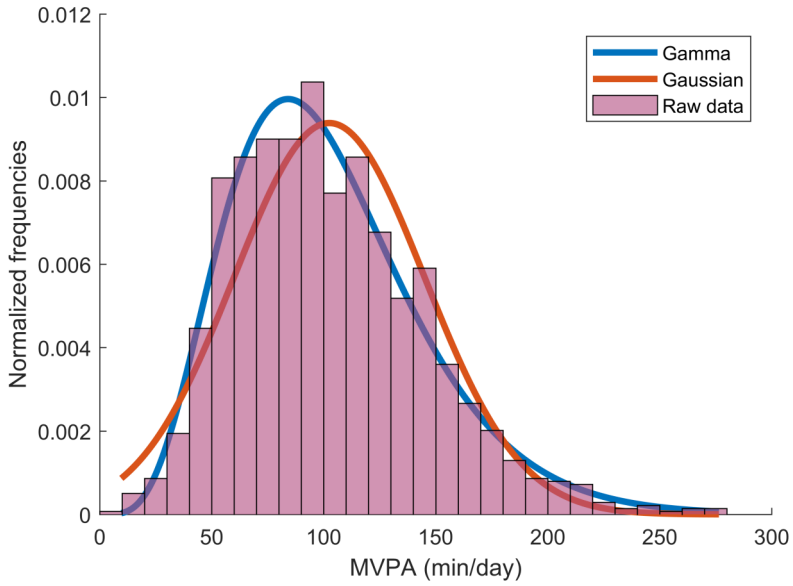

Figure S2. MVPA Histogram. *Normalized frequencies as a function of MVPA and best-fit curves for Gamma and Gaussian distributions. N= 1388 days.*

Table S2. Matlab output of Model 2.

```
mdl =fitglme(data,'MVPA ~ 1 + Day_Type +
(Day_Type|Subject)','Distribution','Gamma','link','log','FitMethod','REMPL');

Generalized linear mixed-effects model fit by PL

Model information:
    Number of observations            1388
    Fixed effects coefficients           2
    Random effects coefficients        544
    Covariance parameters                4
    Distribution                     Gamma
    Link                             Log
    FitMethod                        REMPL

Formula:
    MVPA ~ 1 + Day_Type + (1 + Day_Type | Subject)

Model fit statistics:
    AIC       BIC       LogLikelihood    Deviance
    1054.5    1085.9    -521.25          1042.5

Fixed effects coefficients (95% CIs):
    Name                 Estimate    SE          tStat     DF      pValue         Lower      Upper
    '(Intercept)'          4.346     0.028928    150.23    1386            0     4.2893     4.4028
    'Day_Type_1'         0.29655     0.028327    10.469    1386    9.7834e-25    0.24098    0.35212

Random effects covariance parameters:
Group: Subject (272 Levels)
    Name1                Name2                Type          Estimate
    '(Intercept)'        '(Intercept)'        'std'          0.38555
    'Day_Type_1'         '(Intercept)'        'corr'        -0.68456
    'Day_Type_1'         'Day_Type_1'         'std'          0.34486

Group: Error
    Name                       Estimate
    'sqrt(Dispersion)'         0.26912
```

Model 3: Univariable GLMM for day type effects on walking activity (WA)

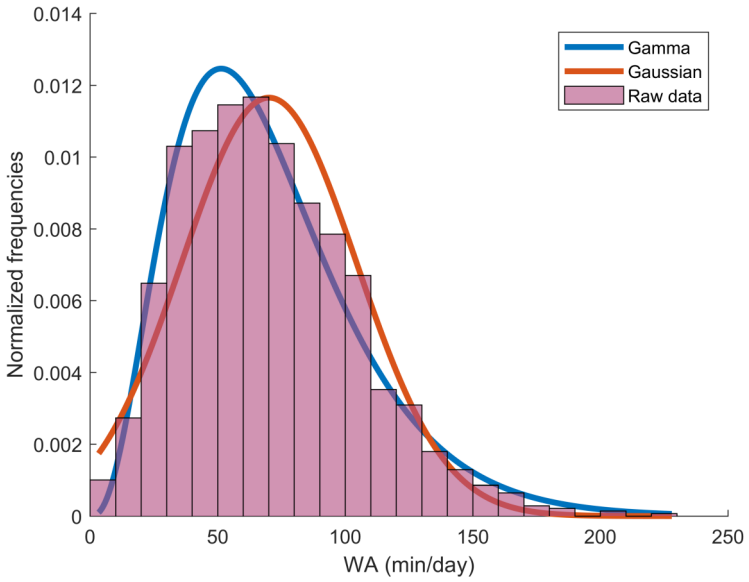

Figure S3. WA Histogram. *Normalized frequencies as a function of WA and best-fit curves for Gamma and Gaussian distributions. N= 1388 days.*

Table S3. Matlab output of Model 3.

```
mdl =fitglme(data,'WA~ 1 + Day_Type +
(Day_Type|Subject)','Distribution','Gamma','link','log','FitMethod','REMPL');

Generalized linear mixed-effects model fit by PL

Model information:
    Number of observations            1388
    Fixed effects coefficients           2
    Random effects coefficients        544
    Covariance parameters                4
    Distribution                     Gamma
    Link                             Log
    FitMethod                        REMPL

Formula:
    WA ~ 1 + Day_Type + (1 + Day_Type | Subject)

Model fit statistics:
    AIC       BIC       LogLikelihood    Deviance
    1528.5    1559.9    -758.23          1516.5

Fixed effects coefficients (95% CIs):
    Name                 Estimate    SE          tStat     DF      pValue         Lower     Upper
    '(Intercept)'         3.7781     0.035947     105.1    1386             0    3.7076    3.8487
    'Day_Type_1'         0.50425     0.035709    14.121    1386    2.1052e-42    0.4342    0.5743

Random effects covariance parameters:
Group: Subject (272 Levels)
    Name1                Name2                Type          Estimate
    '(Intercept)'        '(Intercept)'        'std'          0.48745
    'Day_Type_1'         '(Intercept)'        'corr'        -0.70506
    'Day_Type_1'         'Day_Type_1'         'std'          0.45291

Group: Error
    Name                       Estimate
    'sqrt(Dispersion)'         0.3119
```

Model 4: Univariable GLMM for day type effects on long walks (LW)

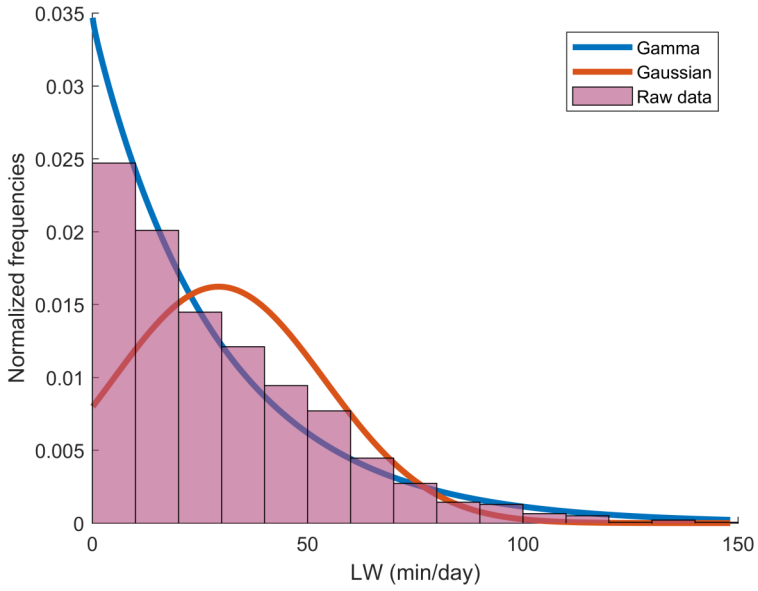

Figure S4. LW Histogram. *Normalized frequencies as a function of LW and best-fit curves for Gamma and Gaussian distributions. N= 1388 days.*

Table S4. Matlab output of Model 4.

```
mdl =fitglme(data,'LW~ 1 + Day_Type +
(Day_Type|Subject)','Distribution','Gamma','link','log','FitMethod','REMPL');

Generalized linear mixed-effects model fit by PL

Model information:
    Number of observations            1388
    Fixed effects coefficients           2
    Random effects coefficients        544
    Covariance parameters                4
    Distribution                     Gamma
    Link                             Log
    FitMethod                        REMPL

Formula:
    LW ~ 1 + Day_Type + (1 + Day_Type | Subject)

Model fit statistics:
    AIC       BIC       LogLikelihood    Deviance
    3329.2    3360.6    -1658.6          3317.2

Fixed effects coefficients (95% CIs):
    Name                Estimate    SE          tStat     DF      pValue         Lower     Upper
    '(Intercept)'       1.9786      0.092186    21.463    1386    1.8507e-88     1.7978    2.1594
    'Day_Type_1'        1.3917      0.090186    15.431    1386    1.0657e-49     1.2148    1.5686

Random effects covariance parameters:
Group: Subject (272 Levels)
    Name1               Name2               Type          Estimate
    '(Intercept)'       '(Intercept)'       'std'           1.3207
    'Day_Type_1'        '(Intercept)'       'corr'        -0.88808
    'Day_Type_1'        'Day_Type_1'        'std'           1.2464

Group: Error
    Name                      Estimate
    'sqrt(Dispersion)'        0.56993
```

Model 5: Multivariable GLMM for moderate-to-vigorous physical activity (MVPA)

Table S5. Matlab ANOVA analysis of Model 5

```
mdl = fitglme(data,'MVPA ~ 1 + PI * Site * Day_Type +
(Day_Type|Subject)','Distribution','Gamma','link','log','FitMethod','MPL');

anova(mdl)

ANOVA marginal tests: DFMethod = 'residual'

    Term                    FStat       DF1    DF2     pValue
    '(Intercept)'             8123.5    1      1348            0
    'Day_Type'                43.302    1      1348    6.6972e-11
    'PI'                       0.651    1      1348        0.4199
    'Site'                  0.078317    2      1348       0.92468
    'Day_Type:PI'            0.41375    1      1348       0.52018
    'Day_Type:Site'           1.2733    2      1348       0.28024
    'PI:Site'                 4.6021    2      1348      0.010189
    'Day_Type:PI:Site'        4.0144    2      1348      0.018271
```

Table S6. Matlab output of Model 5

```
mdl = fitglme(data,'MVPA ~ 1 + Day_Type + PI * Site + Day_Type:PI:Site +
(Day_Type|Subject)','Distribution','Gamma','link','log','FitMethod','REMPL');


Generalized linear mixed-effects model fit by PL

Model information:
    Number of observations            1360
    Fixed effects coefficients           9
    Random effects coefficients        534
    Covariance parameters                4
    Distribution                     Gamma
    Link                             Log
    FitMethod                        REMPL

Formula:
    MVPA ~ 1 + Day_Type + PI*Site + Day_Type:PI:Site + (1 + Day_Type | Subject)

Model fit statistics:
    AIC       BIC       LogLikelihood    Deviance
    1034.5    1102.2    -504.26          1008.5

Fixed effects coefficients (95% CIs):
    Name                    Estimate      SE          tStat     DF      pValue         Lower         Upper
    '(Intercept)'            4.4094      0.039106     112.76    1351           0       4.3327        4.4861
    'Day_Type_1'             0.2786      0.030132      9.246    1351   8.8002e-20       0.21949       0.33771
    'PI'                    -0.029748    0.01524      -1.9519   1351     0.051153     -0.059644     0.00014923
    'Site_2'                -0.09783     0.052583     -1.8605   1351     0.063032      -0.20098      0.0053226
    'Site_3'                -0.051856    0.043377      -1.1955  1351      0.23212      -0.13695       0.033238
    'PI:Site_2'             -0.075762    0.031161     -2.4313   1351     0.015174      -0.13689      -0.014633
    'PI:Site_3'              0.0098085     0.0264      0.37153   1351       0.7103     -0.041982       0.061599
    'Day_Type_1:PI:Site_2'  0.065155      0.02675       2.4357  1351     0.014991      0.012679       0.11763
    'Day_Type_1:PI:Site_3'-0.0087286     0.02138      -0.40826  1351      0.68314      -0.05067       0.033213

Random effects covariance parameters:
Group: Subject (267 Levels)
    Name1               Name2               Type          Estimate
    '(Intercept)'       '(Intercept)'       'std'         0.37114
    'Day_Type_1'        '(Intercept)'       'corr'        -0.6916
    'Day_Type_1'        'Day_Type_1'        'std'         0.34786

Group: Error
    Name                    Estimate
    'sqrt(Dispersion)'      0.26535
```

Model 6: Multivariable GLMM for walking activity (WA)

Table S7. Matlab ANOVA analysis of Model 6

```
mdl = fitglme(data,'WA ~ 1 + PI * Site * Day_Type +
(Day_Type|Subject)','Distribution','Gamma','link','log','FitMethod','MPL');

anova(mdl)

ANOVA marginal tests: DFMethod = 'residual'

    Term                    FStat      DF1    DF2     pValue
    '(Intercept)'            3864.1    1      1348            0
    'Day_Type'               78.925    1      1348    2.0177e-18
    'PI'                    0.66817    1      1348       0.41383
    'Site'                  0.11266    2      1348       0.89346
    'Day_Type:PI'           0.22924    1      1348       0.63216
    'Day_Type:Site'          1.7164    2      1348        0.1801
    'PI:Site'                3.8504    2      1348      0.021505
    'Day_Type:PI:Site'       3.7847    2      1348      0.022958
```

Table S8. Matlab ouput of Model 6

```
mdl = fitglme(data,'WA ~ 1 + Day_Type + PI * Site + Day_Type:PI:Site +
(Day_Type|Subject)','Distribution','Gamma','link','log','FitMethod','REMPL');


Generalized linear mixed-effects model fit by PL

Model information:
    Number of observations            1360
    Fixed effects coefficients           9
    Random effects coefficients        534
    Covariance parameters                4
    Distribution                     Gamma
    Link                             Log
    FitMethod                        REMPL

Formula:
    WA ~ 1 + Day_Type + PI*Site + Day_Type:PI:Site + (1 + Day_Type | Subject)

Model fit statistics:
    AIC       BIC       LogLikelihood    Deviance
    1517.7    1585.4    -745.85          1491.7

Fixed effects coefficients (95% CIs):
    Name                     Estimate     SE          tStat       DF      pValue       Lower        Upper
    '(Intercept)'              3.8349     0.04891      78.409     1351            0       3.739       3.9309
    'Day_Type_1'              0.48015     0.037926      12.66     1351    8.526e-35     0.40575      0.55455
    'PI'                    -0.034033     0.018993    -1.7919     1351     0.073381    -0.071293    0.0032264
    'Site_2'                -0.095419     0.065431    -1.4583     1351      0.14499     -0.22378     0.032938
    'Site_3'                -0.019085     0.054044    -0.35314    1351      0.72404      -0.1251     0.086934
    'PI:Site_2'             -0.073756     0.038998    -1.8913     1351     0.058798     -0.15026    0.0027463
    'PI:Site_3'              0.028772     0.033037     0.87093    1351      0.38395    -0.036036     0.093581
    'Day_Type_1:PI:Site_2'   0.077269     0.033639       2.297    1351      0.02177     0.011279      0.14326
    'Day_Type_1:PI:Site_3' -0.012245     0.026914    -0.45498    1351       0.6492    -0.065043     0.040552

Random effects covariance parameters:
Group: Subject (267 Levels)
    Name1                Name2                Type          Estimate
    '(Intercept)'        '(Intercept)'        'std'         0.47501
    'Day_Type_1'         '(Intercept)'        'corr'        -0.7028
    'Day_Type_1'         'Day_Type_1'         'std'         0.45362

Group: Error
    Name                      Estimate
    'sqrt(Dispersion)'        0.30959
```

Model 7: Multivariable GLMM for long walks (LW)

Table S9. Matlab ANOVA analysis of Model 7

```
mdl = fitglme(data,'LW ~ 1 + PI * Site * Day_Type +
(Day_Type|Subject)','Distribution','Gamma','link','log','FitMethod','MPL');

anova(mdl)

ANOVA marginal tests: DFMethod = 'residual'

    Term                      FStat      DF1    DF2     pValue
    '(Intercept)'              157.23    1      1348    3.3929e-34
    'Day_Type'                 91.817    1      1348    4.3849e-21
    'PI'                      0.45594    1      1348       0.49964
    'Site'                    0.43166    2      1348       0.64952
    'Day_Type:PI'             0.04171    1      1348        0.8382
    'Day_Type:Site'            1.7554    2      1348       0.17323
    'PI:Site'                  1.8851    2      1348       0.15221
    'Day_Type:PI:Site'          2.126    2      1348       0.11971
```

Table S10. Matlab output of Model 7

```
mdl = fitglme(data,'LW ~ 1 + Day_Type + PI + Site +
(Day_Type|Subject)','Distribution','Gamma','link','log','FitMethod','REMPL');


Generalized linear mixed-effects model fit by PL

Model information:
    Number of observations            1360
    Fixed effects coefficients           5
    Random effects coefficients        534
    Covariance parameters                4
    Distribution                     Gamma
    Link                             Log
    FitMethod                        REMPL

Formula:
    LW ~ 1 + Day_Type + PI + Site + (1 + Day_Type | Subject)

Model fit statistics:
    AIC       BIC       LogLikelihood    Deviance
    3261.5    3308.4    -1621.8          3243.5

Fixed effects coefficients (95% CIs):
    Name                 Estimate     SE          tStat      DF      pValue         Lower         Upper
    '(Intercept)'           2.0627     0.10886     18.949     1355    3.2422e-71       1.8492        2.2763
    'Day_Type_1'            1.3663     0.08965       15.24    1355    1.5862e-48       1.1904        1.5422
    'PI'                 -0.038271     0.02033    -1.8825     1355      0.059983    -0.078153     0.0016106
    'Site_2'              -0.17206     0.11282    -1.5251     1355       0.12746     -0.39338      0.049257
    'Site_3'             -0.053089    0.097145    -0.5465     1355       0.58481     -0.24366       0.13748

Random effects covariance parameters:
Group: Subject (267 Levels)
    Name1                Name2                Type          Estimate
    '(Intercept)'        '(Intercept)'        'std'           1.3062
    'Day_Type_1'         '(Intercept)'        'corr'        -0.88596
    'Day_Type_1'         'Day_Type_1'         'std'           1.2217

Group: Error
    Name                      Estimate
    'sqrt(Dispersion)'        0.56787
```

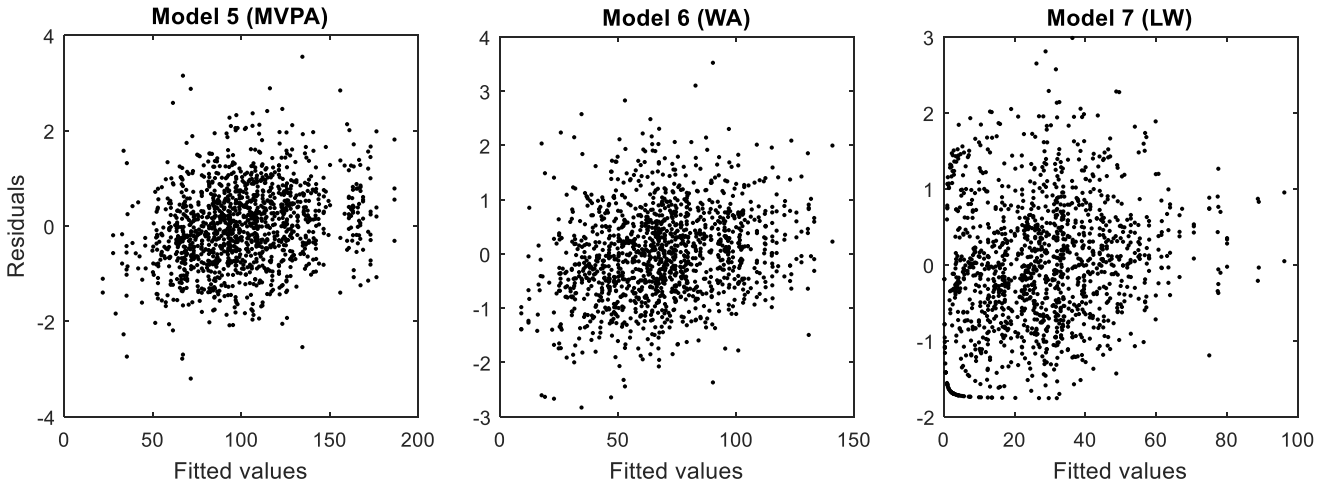

Fig. S5. Pearson's residuals of the multivariable models. Contributions from both fixed effects and random effects (conditional).