**Supplemental figures**

**Supplemental figure 1. Vastus lateralis MRI imaging and muscle biopsies sections**



RepresentativeT1 and TIRM images and corresponding muscle biopsy sections (HPhlox staining) from the tibialis anterior of control, IBM, FSHD and OPMD participants. **Control** Participant C3, MRI shows 1% fatty infiltration and negative TIRM. The muscle biopsy has a histopathological severity sum score of 1 and shows mild increased variability in fiber size, no increase in internal nuclei, no necrosis and/or regeneration, and no fibrosis. Inflammation was scored as none. **IBM** Participant I2, MRI shows fatty infiltration and TIRM-hyperintense changes. Quantitative assessment of fatty infiltration is not reliable in TIRM hyperintense muscles. The muscle biopsy has a histopathological severity sum score of 4 and shows mild increased variability in fiber size, a mild increase in internal nuclei, mild necrosis and/or regeneration, and mild fibrosis. Inflammation was scored as moderate. **FSHD** Participant F2, MRI shows 58% fatty infiltration and negative TIRM. The muscle biopsy has a histopathological severity sum score of 6 and shows moderately increased variability in fiber size, a mild increase in internal nuclei, mild necrosis and/or regeneration, and moderate fibrosis. Inflammation was scored as moderate. **OPMD** Participant O5, MRI shows 10% fatty infiltration and negative TIRM. The muscle biopsy has a histopathological severity sum score of 7 and shows severe increased variability in fiber size, a mild increase in internal nuclei, mild necrosis and/or regeneration, and moderate fibrosis. Inflammation was scored as none.

**Supplemental tables  
Supplemental table 1**. Healthy controls

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **ID** | **Muscle** | **Fat (%)** | **TIRM hyperintense** | **Sumscore** | **Variability in fiber size** | **Increased central nuclei** | **Necrosis and/or regeneration** | **Interstitial fibrosis** | **Inflammation** |
| C01 | VL | 2 | No | 3 | Mild | Mild | None | Mild | None |
|  | TA | 4 | No | 2 | Mild | None | None | Mild | None |
| C02 | VL | 8 | No | 1 | Mild | None | None | None | None |
| C03 | VL | 1 | No | 1 | Mild | None | None | None | None |
|  | TA | 3 | No | 3 | Mild | Mild | None | Mild | None |
| C04 | VL | 5 | No | 1 | Mild | None | None | None | None |
|  | TA | 7 | No | 3 | Mild | Mild | None | Mild | None |
| C05 | TA | 1 | No | 2 | Mild | Mild | None | None | None |
| C06 | VL | 9 | No | 1 | None | None | None | None | None |
|  | TA | 1 | No | 2 | Mild | Mild | None | None | None |
| C07 | VL | 3 | No | 0 | None | None | None | None | None |
|  | TA | 3 | No | 3 | Mild | Mild | None | Mild | None |
| C08 | VL | 26 | No | 2 | Mild | Mild | None | None | None |
|  | TA | 7 | No | 1 | None | Mild | None | None | None |
| C09 | VL | 8 | No | 2 | None | Mild | Mild | None | None |
|  | TA | 9 | No | 4 | Mild | Moderate | Mild | None | Mild |
| C10 | VL | 3 | No | 1 | Mild | None | None | None | None |
|  | TA | 5 | No | 2 | Mild | None | None | Mild | None |
| C11 | VL | 3 | No | 1 | Mild | None | None | None | None |
|  | TA | 3 | No | 2 | Mild | Mild | None | None | None |
| C12 | VL | 4 | No | 1 | Mild | None | None | None | None |
|  | TA | 3 | No | 3 | Mild | Mild | Mild | None | None |

**Supplemental table 2**. IBM

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **ID** | **Muscle** | **Fat (%)** | **TIRM hyperintense** | **Sumscore** | **Variability in fiber size** | **Increased central nuclei** | **Necrosis and/or regeneration** | **Interstitial fibrosis** | **Inflammation** |
| I01 | VL | 56 | Yes | 9 | Severe | Moderate | Moderate | Moderate | Moderate |
|  | TA | 19 | No | 6 | Moderate | Moderate | Mild | Mild | Moderate |
| I02 | VL | 76 | Yes | 4 | Mild | Mild | Mild | Mild | Moderate |
|  | TA | 82 | Yes | 11 | Severe | Moderate | Severe | Severe | Severe |
| I03 | TA | 6 | Yes | 4 | Moderate | Mild | Mild | None | Moderate |
| I04 | VL | 29 | No | 11 | Severe | Severe | Moderate | Severe | Moderate |
|  | TA | 14 | No | 6 | Moderate | Mild | Mild | Moderate | Moderate |
| I05 | VL | 38 | No | 6 | Mild | Moderate | Moderate | Mild | Moderate |
|  | TA | 12 | No | 3 | Mild | Mild | None | Mild | Mild |
| I06 | VL | 14 | No | 4 | Mild | Mild | Mild | Mild | Mild |
|  | TA | 49 | Yes | 10 | Severe | Moderate | Moderate | Severe | Moderate |
| I07 | TA | 24 | No | 10 | Severe | Severe | Mild | Severe | None |
| I08 | VL | 84 | Yes | 8 | Severe | Severe | Moderate | None | Moderate |

**Supplemental table 3**. FSHD

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **ID** | **Muscle** | **Fat (%)** | **TIRM hyperintense** | **Sumscore** | **Variability in fiber size** | **Increased central nuclei** | **Necrosis and/or regeneration** | **Interstitial fibrosis** | **Inflammation** |
| F01 | VL | 3 | No | 3 | Mild | Mild | None | Mild | None |
|  | TA | 80 | No | 9 | Severe | Severe | None | Severe | None |
| F02 | VL | 58 | No | 6 | Moderate | Mild | Mild | Moderate | Moderate |
|  | TA | 20 | No | 7 | Moderate | Moderate | Mild | Moderate | None |
| F03 | VL | 5 | No | 4 | Mild | Mild | Mild | Mild | Mild |
|  | TA | 6 | No | 1 | Mild | None | None | None | None |
| F04 | VL | 0 | No | 3 | Mild | Mild | None | Mild | None |
|  | TA | 10 | No | 4 | Mild | Mild | None | Moderate | None |
| F05 | VL | 88 | No | 8 | Severe | Moderate | Mild | Moderate | None |
|  | TA | 97 | No | 11 | Severe | Moderate | Severe | Severe | Mild |
| F06 | VL | 28 | No | 2 | Mild | None | None | Mild | None |
|  | TA | 6 | No | 4 | Mild | Mild | Mild | Mild | None |
| F07 | VL | 0 | No | 4 | Mild | Mild | Mild | Mild | Mild |
|  | TA | 10 | No | 6 | Moderate | Moderate | Mild | Mild | None |
| F08 | VL | 0 | No | 1 | None | Mild | None | None | None |
|  | TA | 1 | No | 2 | Mild | Mild | None | None | None |
| F09 | VL | 57 | No | 8 | Moderate | Severe | Mild | Moderate | None |
| F10 | TA | 64 | - | 7 | Moderate | Moderate | Mild | Moderate | None |
| F11 | VL | 5 | No | 1 | Mild | None | None | None | None |
|  | TA | 6 | No | 2 | Mild | Mild | None | None | Mild |
| F12 | VL | 1 | No | 3 | Mild | Mild | None | Mild | None |
|  | TA | 5 | No | 4 | Mild | Moderate | None | Mild | None |
| F13 | VL | 5 | No | 4 | Moderate | Mild | Mild | None | None |
|  | TA | 69 | Yes | 3 | Mild | Mild | Mild | None | Mild |

**Supplemental table 4**. OPMD

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **ID** | **Muscle** | **Fat (%)** | **TIRM hyperintense** | **Sumscore** | **Variability in fiber size** | **Increased central nuclei** | **Necrosis and/or regeneration** | **Interstitial fibrosis** | **Inflammation** |
| O01 | TA | 3 | No | 3 | Mild | Mild | Mild | None | None |
| O02 | TA | 19 | No | 3 | Mild | Mild | Mild | None | None |
| O03 | TA | 4 | No | 3 | Moderate | None | None | Mild | None |
| O04 | VL | 7 | No | 0 | None | None | None | None | None |
| O05 | VL | 10 | No | 7 | Severe | Mild | Mild | Moderate | None |
| O06 | TA | 15 | No | 3 | Mild | Mild | None | Mild | None |
| O07 | VL | 17 | No | 2 | Mild | None | Mild | None | Mild |
|  | TA | 6 | No | 3 | Mild | Mild | Mild | None | None |
| O08 | TA | 6 | No | 2 | Mild | Mild | None | None | None |
| O09 | VL | 4 | No | 1 | Mild | None | None | None | None |
|  | TA | 12 | No | 2 | Mild | Mild | None | None | None |
| O10 | VL | 11 | No | 4 | Mild | Mild | Mild | Mild | None |
|  | TA | 5 | No | 4 | Moderate | Mild | None | Mild | None |
| O11 | VL | 2 | No | 4 | Mild | Mild | Mild | Mild | None |
|  | TA | 5 | No | 3 | Mild | Mild | None | Mild | None |
| O12 | VL | 7 | No | 1 | None | None | None | None | None |
| O13 | VL | 4 | No | 2 | Mild | None | None | Mild | None |
| O14 | VL | 9 | No | 6 | Severe | Mild | Mild | Mild | None |
|  | TA | 3 | No | 5 | Mild | Moderate | Mild | Mild | None |