S3 Table. Positive and negative mechanical joint work calculated with integration for each gait phase. AFO stiffness was varied from 0 – 7 Nm/deg.

| Stiffness (Nm/deg) | 0       | 1       | 2       | 3       | 4       | 5       | 6       | 7       |
|-------------------|---------|---------|---------|---------|---------|---------|---------|---------|
| **Ankle joint work (J/kg)** |         |         |         |         |         |         |         |         |
| **Loading Response** |         |         |         |         |         |         |         |         |
| Positive | 0.000 | 0.002 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.006 |
| Negative | -0.046 | -0.011 | -0.034 | -0.012 | -0.020 | -0.015 | -0.016 | -0.003 |
| **MidStance** |         |         |         |         |         |         |         |         |
| Positive | 0.021 | 0.000 | 0.005 | 0.006 | 0.009 | 0.006 | 0.002 | 0.006 |
| Negative | -0.063 | -0.040 | -0.050 | -0.027 | -0.026 | -0.026 | -0.026 | -0.006 |
| **Push-Off** |         |         |         |         |         |         |         |         |
| Positive | 0.116 | 0.123 | 0.123 | 0.154 | 0.129 | 0.121 | 0.113 | 0.093 |
| Negative | -0.010 | -0.004 | -0.002 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| **Swing** |         |         |         |         |         |         |         |         |
| Positive | 0.003 | 0.003 | 0.003 | 0.002 | 0.002 | 0.003 | 0.002 | 0.002 |
| Negative | -0.001 | -0.004 | -0.004 | -0.003 | -0.007 | -0.005 | -0.006 | -0.005 |
| **AFO work (J/kg)** |         |         |         |         |         |         |         |         |
| **Loading Response** |         |         |         |         |         |         |         |         |
| Positive | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.002 | 0.000 | 0.000 |
| Negative | 0.000 | -0.006 | -0.009 | -0.008 | -0.007 | -0.004 | -0.002 | -0.008 |
| **MidStance** |         |         |         |         |         |         |         |         |
| Positive | 0.000 | 0.000 | 0.004 | 0.005 | 0.009 | 0.007 | 0.002 | 0.008 |
| Negative | 0.000 | -0.024 | -0.030 | -0.049 | -0.051 | -0.051 | -0.044 | -0.049 |
| **Push-Off** |         |         |         |         |         |         |         |         |
| Positive | 0.000 | 0.027 | 0.035 | 0.051 | 0.048 | 0.047 | 0.043 | 0.048 |
| Negative | 0.000 | -0.001 | -0.002 | -0.004 | -0.003 | -0.003 | -0.005 | -0.005 |
| **Swing** |         |         |         |         |         |         |         |         |
| Positive | 0.000 | 0.001 | 0.004 | 0.003 | 0.004 | 0.003 | 0.005 | 0.004 |
| Negative | 0.000 | -0.001 | -0.002 | 0.000 | -0.001 | -0.003 | 0.000 | 0.000 |
| **Knee joint work (J/kg)** |         |         |         |         |         |         |         |         |
| **Loading Response** |         |         |         |         |         |         |         |         |
| Positive | 0.029 | 0.053 | 0.036 | 0.046 | 0.050 | 0.041 | 0.039 | 0.038 |
| Negative | -0.123 | -0.004 | -0.002 | 0.000 | 0.000 | -0.008 | -0.001 | 0.000 |
| **MidStance** |         |         |         |         |         |         |         |         |
| Positive | 0.168 | 0.047 | 0.056 | 0.019 | 0.010 | 0.004 | 0.006 | 0.004 |
| Negative | -0.009 | -0.010 | -0.023 | -0.009 | -0.024 | -0.057 | -0.039 | -0.048 |
| **Push-Off** |         |         |         |         |         |         |         |         |
| Positive | 0.007 | 0.013 | 0.020 | 0.012 | 0.014 | 0.011 | 0.013 | 0.011 |
| Negative | -0.066 | -0.058 | -0.055 | -0.019 | -0.023 | -0.026 | -0.025 | -0.049 |
| **Swing** |         |         |         |         |         |         |         |         |
| Positive | 0.004 | 0.007 | 0.000 | 0.009 | 0.012 | 0.007 | 0.006 | 0.007 |
| Negative | -0.116 | -0.145 | -0.151 | -0.150 | -0.179 | -0.172 | -0.148 | -0.174 |
### Hip joint work (J/kg)

|                      | Loading Response |                     |                     |                     |                     |                     |                     |
|----------------------|------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|
|                      | Positive        | Negative            | Positive            | Negative            | Positive            | Negative            | Positive            |
| **MidStance**        |                 |                     |                     |                     |                     |                     |                     |
| Positive             | 0.213           | -0.030              | 0.137               | -0.035              | 0.136               | -0.046              | 0.129               |
| Negative             | 0.136           | -0.046              | 0.129               | -0.080              | 0.150               | -0.087              | 0.173               |
|                      |                 |                     |                     |                     |                     |                     |                     |
| **Push-Off**         |                 |                     |                     |                     |                     |                     |                     |
| Positive             | 0.147           | -0.111              | 0.151               | -0.081              | 0.168               | -0.065              | 0.135               |
| Negative             | 0.135           | -0.065              | 0.103               | -0.076              | 0.149               | -0.053              | 0.149               |
|                      |                 |                     |                     |                     |                     |                     |                     |
| **Swing**            |                 |                     |                     |                     |                     |                     |                     |
| Positive             | 0.058           | -0.014              | 0.079               | -0.009              | 0.065               | -0.009              | 0.103               |
| Negative             | -0.014          | -0.009              | -0.009              | -0.023              | -0.023              | -0.015              | -0.126              |
|                      |                 |                     |                     |                     |                     |                     |                     |
| **Total**            |                 |                     |                     |                     |                     |                     | 0.058               |
|                      |                 |                     |                     |                     |                     |                     | 0.058               |