**Supplemental material**

**Research terms**

(damage OR “muscle damage” OR “muscle function” OR “muscle fatigue” OR “creatine kinase” OR myoglobin OR LDH OR IL6 OR inflammation OR DOMS OR “muscle soreness” OR “fibers disruption” OR “inflammatory response”) AND (“menstrual cycle” OR “female hormones” OR “sex hormones” OR “oral contraceptives” OR “oral contraception” OR “contraceptive pill” OR contraceptives OR contraception OR women OR female OR oestrogen OR progesterone OR eumenorrheic OR menopaus\* OR \*follicular OR \*luteal) AND (“resistance exercise” OR “resistance training” OR “strength exercise” OR “strength training” OR “eccentric exercise” OR “eccentric training” OR eccentric OR “resistance-based exercise” OR “resistance-based training” OR “weight training” OR weightlifting OR “downhill running” OR marathon OR jump OR exercise OR CMJ OR SJ OR “power training” OR “endurance training” OR “endurance exercise” OR strengthening OR “physical activity”) NOT (obes\* OR Elder\* OR older OR cancer OR polycystic OR pathology OR pathologies OR pregnan\* OR patient OR hypertensi\* OR fibromyalgia OR diabetes OR insulin OR animals OR mice OR rats OR rat OR sarcopenia OR osteoar\* OR injury OR arthroplasty OR sclerosis OR “cerebral palsy” OR stroke OR insufficiency OR parkinson OR disease OR HIV OR “rheumatoid arthritis” OR hepatic OR “brain damage” OR “muscle dystrophy”)

**Evaluation of the methodology of the studies selected**

The methodological quality of the selected studies was assessed with the Quality Assessment Tool for Observational Cohort and Cross-Sectional Studies (National Heart, 2014) that analyses the following questions: (1) Study question clearly stated; (2) Study population well-defined; (3) All eligible participants enrolled; (4) Eligibility criteria clearly specified; (5) Sample size estimation provided; (6) Exposure(s) of interest measured prior to the outcome measurement; (7) Sufficient timeframe to see an association between exposure and outcome; (8) Different level of exposure examined; (9) Exposure measures clearly described, valid and reliable; (10) Exposure assessed more than once over time; (11) Outcome measures clearly described, valid and reliable; (12) Blinding of outcome assessors; (13) Follow-up rate; (14) Confounding variables measured and adjusted.

**Risk of bias assessment**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Nº | Study | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | **Sum of the quality criteria** | **Quality Rating** |
| 1 | Anderson et al., 2017 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 0 | 1 | 0 | 11 | Good |
| 2 | Brown et al., 2016 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 9 | Fair |
| 3 | Carter et al., 2001 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 1 | 0 | 1 | 0 | 9 | Fair |
| 4 | Chaffin et al., 2011 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 10 | Good |
| 5 | Fernandez-Gonzalo et al., 2014 | 1 | 1 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 1 | 0 | 8 | Fair |
| 6 | Foster et al., 2018 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 9 | Fair |
| 7 | Hackney 2019 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 9 | Fair |
| 8 | Harris et al., 2018 | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 0 | 10 | Good |
| 9 | Hicks et al., 2016 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 9 | Fair |
| 10 | Hicks et al., 2017 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 0 | 1 | 0 | 11 | Good |
| 11 | Jang et al., 2018 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 9 | Fair |
| 12 | Joyce et al., 2014 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 9 | Fair |
| 13 | Keane, 2015 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 8 | Fair |
| 14 | Larsen et al., 2018 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 10 | Good |
| 15 | Mackay 2019 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 10 | Good |
| 16 | Minahan et al., 2015 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 8 | Fair |
| 17 | Newlin et al., 2012 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 0 | 12 | Good |
| 18 | Nikolaidis et al., 2008 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 1 | 0 | 1 | 0 | 10 | Good |
| 19 | Oosthuyse et al., 2017 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 0 | 1 | 0 | 10 | Good |
| 20 | Pal et al., 2018 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 1 | 0 | 1 | 0 | 10 | Good |
| 21 | Ring et al., 2010 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 1 | 0 | 1 | 0 | 9 | Fair |
| 22 | Savage et al., 2002 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 0 | 1 | 0 | 10 | Good |
| 23 | Sipaviciene et al, 2013 | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 1 | 0 | 1 | 0 | 9 | Fair |
| 24 | Thompson et al., 1997 | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 1 | 0 | 1 | 0 | 9 | Fair |
| 25 | Williams et al., 2015 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 9 | Fair |
| 26 | Wolf et al., 2012 | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 1 | 0 | 1 | 0 | 9 | Fair |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 9.46 | Average |
|  |  | 26 | 23 | 26 | 21 | 8 | 25 | 26 | 3 | 25 | 19 | 26 | 0 | 16 | 2 | 15 | Good |
|  |  | 26 |  |  |  |  |  |  |  |  |  |  |  |  |  | 11 | Fair |
|  |  | 100% | 88% | 100% | 81% | 31% | 96% | 100% | ### | 96% | 73% | 100% | 0% | 62% | 8% | 0 | Poor |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

**Classification of studies according to muscle damage severity**

|  |  |  |  |
| --- | --- | --- | --- |
| **Study** | **Protocol** | **Rate** | **EIMD Severity** |
| 1 | Anderson et al., 2017 | 1.3 | Moderate damage |
| 2 | Brown et al., 2016 (Dancing protocol) | 0.8 | Light damage |
| 3 | Brown et al., 2016 (Sprint protocol) | 2.5 | Moderate damage |
| 4 | Chaffin et al., 2011 | 1.0 | Light damage |
| 5 | Hackney et al., 2019 | 0.7 | Light damage |
| 6 | Hicks et al., 2016 | 2.5 | Moderate damage |
| 7 | Hicks et al., 2017 | 2.5 | Moderate damage |
| 8 | Jang et al., 2018 | 0.8 | Light damage |
| 9 | Joyce et al., 2014 | 3.0 | Severe damage |
| 10 | Keane et al., 2015 | 1.7 | Moderate damage |
| 11 | Mackay et al., 2019 | 2.2 | Moderate damage |
| 12 | Minahan et al., 2015 | 3.0 | Severe damage |
| 13 | Nikolaidis et al., 2008 | 3.2 | Severe damage |
| 14 | Oosthuyse et al., 2017 | 2.0 | Moderate damage |
| 15 | Pal et al., 2018 | 1.3 | Moderate damage |
| 16 | Savage et al., 2002 | 4.3 | Severe damage |
| 17 | Sipaviciene et al., 2013 | 1.3 | Moderate damage |
| 18 | Thomson et al., 1997 | 0.8 | Light damage |
| 19 | Williams et al., 2015 | 0.7 | Light damage |
| 20 | Wolf et al., 2012 | 1.3 | Moderate damage |
|  |  |  |  |
|  | Top third (33%) | 1.3 | Light damage |
|  | Second third (66%) | 2.5 | Moderate |
|  |  |  |  |