**Supplemental Digital Content 6: Study methodological characteristics and results for the association between muscular strength and MSK-I in males and females**

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Author,**  **Country, Population** | **Quality** | **Sample Size** | **Follow-Up** | **MSK-I Type** | **Fitness Test** | **Strength of Association** | | | | |
| **Crude Association** | **Association with Adjustments** | | **Direction of Association** | |
| **Isokinetic - Ankle** |  |  |  |  |  |  |  | |  | |
| Hadzic et al. (21),  Slovenia, Volleyball | Poor | M=38 | 6 mo  (1 season) | A/T  (Ankle Sprain) | Concentric Ankle PF | NS | ***Increased PF Strength:***  OR=1.22 (1.04-1.43,  *p<*0.05) |  | | |
| -- | | |
| Concentric Ankle DF | NS | ≠ | | |
| Willems et al. (66),  Belgium, College Physical Education Students | Fair | F=159 | 3 years | A/T  (Ankle Sprain) | Concentric & Eccentric Ankle Inversion & Eversion | NS | -- | ≠ | | |
| Concentric Ankle PF & DF | ***Increased DF Strength:***  HR=756.52  (1.40–408864.14, *p=*0.04) | --**a** | + | | |
|  |  |  |  |  |  |  |  | | |  |
| **Isokinetic - Hip** |  |  |  |  |  |  |  | | |  |
| Verrelst et al. (63),  Belgium, PE Students | Fair | F=81 | 29 wk | Exertional Medial Tibial Pain | Concentric Hip ABD/ADD/  ER/IR | NS | NS | ≠ | | |
| Eccentric Hip ABD/IR | NS | NS | ≠ | | |
|  |  |  |  |  |  |  |  | | |  |
| **Isotonic** |  |  |  |  |  |  |  | | |  |
| Blacker et al. (4),  United Kingdom, Army (BCT) | Fair | 13,417  (M=11,937  F=1,480) | 12 wk | A/T & O | Dynamic Lift Strength | ***All groups compared to lowest group:***  ***Medical Referral:***  HR=0.41 (0.33-0.51,  *p<*0.001)  HR=0.45 (0.38-0.55,  *p<*0.001)  HR=0.37 (0.28-0.47,  *p<*0.001)  HR=0.52 (0.42-0.66,  *p<*0.001) | NS | **+** | | |
| Gabbett et al. (16), Australia, Rugby | Fair | M=66 | 3 years  (3 seasons) | Contact Injury | Weighted Full Squat 1 RM | -- | NS | **≠** | | |
| Bench Press  1 RM | NS | **≠** | | |
| Weighted  Chin-Up 1 RM | ***Better performance:***  HR=0.45 (0.27-0.75,  *p<*0.01)b | ++ | | |
| Weighted Full Squat 3 RM | NS | NS | **≠** | | |
| Hoffman et al. (26),  Israel, Air Force (BCT) | Poor | M=136 | 9 wk | Overuse  (Stress Fx) | Leg Press  1 RM | NS | ***Strength 1 SD below mean:***  ***1 RM:***  RR=4.7 (1.7-13.6, *p<*0.05)  ***1 RM: (normalized to BW)***  RR=5.2 (1.8-14.7, *p<*0.05) | ++ | | |
|  |  |  |  |  |  |  |  | | |  |
| **Isometric** |  |  |  |  |  |  |  | | |  |
| Blacker et al. (4),  United Kingdom, Army (BCT) | Fair | 13,417  (M=11,937  F=1,480) | 12 wk | A/T & O | Isometric Back EXT | ***All groups compared to weakest:***  ***Medical Referral:***  HR= 0.37 (0.30-0.47,  *p<*0.001)  HR=0.46 (0.38-0.58,  *p<*0.001)  HR=0.38 (0.31-0.48,  *p<*0.001)  HR=0.57 (0.47-0.70,  *p<*0.001) | NS | + | | |
| Emery et al. (13),  Canada & USA, Hockey | Fair | M=1,292 | 1 Season | A/T & O | Isometric Hip ADD | NS | NS | ≠ | | |
| Leetun et al. (42), USA, Collegiate Basketball & Cross-Country Athletes | Fair | 140  (M=60  F=80) | One athletic season | A/T & O | Isometric Hip ABD | -- | NS | ≠ | | |
| Isometric Hip ER | ***Increasing ER strength:***  OR=0.86 (0.77, 0.97) | ++ | | |
| Tyler et al. (62),  USA, Professional Hockey | Fair | M=47 | 1 or 2 Hockey seasons | Hip Adductor Strain | Isometric Hip Flexion, ABD, ADD | No data provided | ***ADD strength <80% ABD strength:***  Relative risk=17:1 | ++ | | |

M=Male, F=Female, BCT=Basic Combat Training, A/T & O= Acute/Traumatic & Overuse, DF=Dorsiflexion, PF=Plantarflexion, ADD=Adduction, EXT=Extension, FLEX=Flexion, ER=External Rotation, IR=Internal Rotation, BW=Body Weight, RM=Repetition Maximum, Q=Quadriceps, H=Hamstring, RR=Risk Ratio, HR=Hazard Ratio, OR=Odds Ratio, NS=Non-Significant

aHazard Ratios were deemed uninterpretable

bWeighted pull-ups >138kg showed decrease risk of injury

++, Significant multivariate association between low ME/MS and increased MSK-I risk

+, Significant univariate association between low levels of ME/MS and increased MSK-I risk

- -,Significant multivariate association between high levels of ME/MS and increased MSK-I risk

- ,Significant univariate association between high levels of ME/MS and increased MSK-I risk

≠, No significant association