**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=11,937F=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 Press1 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 Press1 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=11,937F=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=60F=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