**S2 Appendix - Data Charting Tables**

**Table 1A: Hand grip strength in dominant vs non-dominant hands**

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| Paper | Total n (n of subset) | Whole study or control group/subset | Description of population | Participants' handedness | Description of exertion(s) | Data reported and location in manuscript | Additional sub-comparisons available | Key Info Summary[(94)](https://www.zotero.org/google-docs/?0r3qPm) |
| Abdullatif, N., Rizvi, A., & Narayanan, S. N. (2021) | 83 | Whole | Healthy volunteers aged 20.2 ± 0.21 years of Arab, South Asian, and Emirati descent | Not indicated | Participants were seated upright with the arm adducted and the elbow flexed at 90° while they grasped a digital handgrip dynamometer (BIOPAC SS25LA). | Data for maximal handgrip strength (kg) is displayed in Table/Figure 1 as well as partial comparisons displayed graphically in Figures 2, 3 and 4. Three measures were taken but with only a 3s interval between each test. | Additional comparisons can be made by sex, and ethnicity. | No effect of handedness on maximal isometric grip strength. |
| Aguiar, R. S. N., da Silva Boschi, S. R. M., Lazzareschi, L., da Silva, A. P., Scardovelli, T. A., Filoni, E., ... & Frère, A. F. (2018) | 36(12) | Subset - non-kinesio tape control group (G3) | University physiotherapy student volunteers aged 19.89 ± 2.94 years | 97.8% right-hand dominant | Participants were seated upright with the arm adducted and the elbow flexed at 90° while the posterior aspect of the forearm was supported by a plank (Figure 1). A Jamar handgrip dynamometer was used to quantify maximal grip strength with the handle at the 2nd position. | Data to be used in this review should be from the G3 control group data outlined in Table 1 (dominant limb) and Table 2 (non-dominant limb). Data used is the mean of three maximal exertion trials. | Sub-comparison is available by testing session (baseline and 1, 2, or 3 days post application of the tape to the experimental groups, Table 1 & 2). | No direct statistical comparison between limbs, however data are ~ 6% greater for the handgrip strength of the dominant limb. |
| Al-Obaidi, S., Al-Sayegh, N., & Nadar, M. (2014) | 177(66) | Subset - control group (nonsmokers) | Local community smoking and non-smoking volunteers | Mixed - 166 right hand dominant and 11 left hand dominant but not broken down by group | Participants were seated upright with the arm adducted and the elbow flexed at 90° in accordance with the American Society of Hand Therapists recommended protocol. All five handle positions were tested for each hand with only a single maximal effort each. | Comparisons of non-smokers maximal grip strength data (kgs) between limbs independent of the fatigue protocol is displayed graphically in Figure 1 (initial) across the 5 handle positions for the dominant (i) and non-dominant (ii) hands. Data used is a single maximal effort for each handle position. | Sub-comparison is available by examining strength differences across the five handle positions of the Jamar Dynamometer (Figure 1, Initial, 1 [shortest] to 5 [longest] grip). | Only differences between dominant and non-dominant hands normalized to fatigue state are presented statistically in the results, however, Figure 1 demonstrates an approximately 10% greater handgrip strength in the dominant hand across the handle positions. |
| Eidson, C. A., Jenkins, G. R., Yuen, H. K., Abernathy, A. M., Brannon, M. B., Pung, A. R., . . . Weaver, T. E. (2017) | 150 | Whole | Injury-free adult volunteers (36 males and 114 females) living in the community aged 19-34 | Mixed - 12 female participants were left-handed and 8 male participants were left-handed | Participants were seated upright with the arm adducted and the elbow flexed at 90° in accordance with the American Society of Hand Therapists recommended protocol. Data were collected for all participants at the second handle position. | Data for maximal grip strength values of the dominant and non-dominant hand is presented in Table 1 (collapsed across age range) as well as in Table 2 (broken down by sex and age range). The average value of three maximal trials was used for each hand. | Sub comparisons can be made by examining data by sex (Table 1 & 2) or by age range of participants (19-24, 25-29, 30-34, Table 2). | As the purpose was to develop regression models to predict maximal handgrip strength, the dominant and non-dominant hand maximal strengths were not statistically compared. However, from examining the data there appears to be a ~2.5% asymmetry for males and a ~8% asymmetry for females, both with stronger dominant hands. |
| Garay, J. L., Barreira, T. V., Wang, Q., & Brutsaert, T. D. (2021) | 124 | Whole | Participants whose gestation age at birth ranged from 37 weeks to 42 weeks and were currently healthy | Not indicated | A Jamar handgrip dynamometer was used to measure handgrip strength however there is no indication of testing posture. | Maximal handgrip strength data are available pre-normalization in Table 3. The highest of the three exertions was included in the analyses. | Further comparisons can be made by sex (Table 1). | The dominant hand was significantly stronger than the non-dominant hand in the whole sample, males and females (~7% greater). |
| Khanna, A., & Koley, S. (2020) | 228(114) | Subset - control, non-athletes only | Student non-athletes from an Indian university. 50 males aged 20.98 ± 1.22 years and 64 females aged 20.87 ± 1.14 years | Not indicated | A takei adjustable digital handgrip dynamometer was used to measure maximal grip strength in a standing position with the elbow extended and the shoulder adducted to the side body. | Maximal grip strength (kg) data can be found in Table 2 and also graphically in Figures 1 (females) and 2 (males). Values recorded for statistics were the peak handgrip measure for three trials in each hand. | Sub-comparison is available based on sex. | Statistical comparisons are only drawn between volleyball athletes and non-volleyball players grip strength, however, results indicate that the dominant hand is ~5% stronger than the non-dominant hand in male controls while it was ~15% stronger in female controls. |
| Kim, J. Y., Kwon, K. B., Song, S. H., Kwon, S.-S., Kang, B. Y., & Kim, D. H. (2018) | 100 | Whole | Healthy males (n=51) and females (n=49) aged 32.1 ± 6.9 years with medium level demand occupations | Not indicated | A takei adjustable digital handgrip dynamometer was used to measure maximal grip strength in a seated posture with the arm adducted and the elbow flexed at 90°. | Data are displayed in Table 1 noting the maximal handgrip strength between the limbs but also values for peak handgrip strength if there were two or three trials collected. Data were collected from two trials, however, if these trials were greater than 10% different, another was collected until uniform values were obtained and the same procedure was followed for the third trial. | Sub comparison is available by sex or by number of trials used to collect the peak handgrip strength value. | Data were statistically examined for comparison between two and three-trial reliability and not between-hand strength difference. Data shows an interesting trend with males reporting a dominant handgrip ~28% greater than the non-dominant while females showed a non-dominant hand ~10% stronger than the dominant. |
| Krasniqi, E., Koni, M., Kabashi, A., Bahtiri, A., Gjeli, S., & Boshnjaku, A. (2016) | 162 | Whole | 53 males and 109 females between 40 and 60 years old from Kosova | Not indicated | Participants performed maximal grip strength exertions on an adjustable handgrip dynamometer (SAEHAN Corporation) from a seated position. | Data for handgrip isometric strength (HIS, kg) can be found in Table 2. Two trials were collected and peak strength was used for statistical analyses. | Sub analysis can be conducted by examining the results by sex (Table 2). | Overall, the dominant hand had significantly greater handgrip strength compared to the non-dominant hand. This result is matched when examining only female data but there is no significant difference in the male-only data. |
| Li, K., Hogrel, J. Y., Duchene, J., & Hewson, D. (2010) | 39 | Whole | 24 males (aged 20.4 ± 0.9) and 15 females (aged 20.0 ± 0.7) | Mixed - breakdown outlined in Table 1 | A Myogrip handgrip dynamometer was used to collect participants' dominant and non-dominant hand strength trials. Participants were seated with an extended elbow and the shoulder adducted to their side body. | Maximal grip strength (MGS, N) is displayed in Table 2 for the dominant and non-dominant hands. Data included was the peak values collected from two maximal trials, or if they were greater than 10% different, a third trial (Trial 1, Trial 2, Table II). | Maximal handgrip data can also be compared across two trials and sex (Table II, MGS). | No statistical difference is noted for the strength difference between hands, but it is remarked in the results that MGS for non-dominant hands averaged 91.2% of that of the dominant hands. |
| Li, X., He, W., Li, C., Wang, Y. C., Slavens, B. A., & Zhou, P. (2015) | 26 | Whole | 17 male and 9 female participants aged 19 to 58 years | Mixed - 24 right-handed and 2 left handed | While seated in an upright posture with their shoulder adducted and neutrally rotated, their elbow flexed between 80° to 100°, and their forearm in the neutral position, participants exerted maximal handgrip against a Jamar handgrip dynamometer. | Figure 1 (top left) is a graphical presentation of strength data in the grip task and pinch task between dominant and non-dominant hands for all participants while individual data for left-handed participants is presented in Table 1. The data included is the highest value of participants' three maximal strength trials. | No sub comparisons available other than the left-hander data separated out. | Dominant hand grip strength was greater than the nondominant hand grip strength by ~6%. |
| Lin, C. H., Chou, L. W., Wei, S. H., Lieu, F. K., Chiang, S. L., & Sung, W. H. (2014) | 31(21) | Subset - only young adult group to be used | 21 healthy young adult community volunteers aged 23.05 ± 3.15 years | Not indicated | Maximal grip strength was evaluated with a custom load cell setup and recorded on LabVIEW. Participants were positioned with the shoulder joints in 30°–40° adduction in the horizontal plane and 40°–50° flexion in the sagittal plane, with the elbow in 100°–110° flexion so that fingers could be easily flexed for 90° to hold the dynamometer. | Data for maximal grip strength (kgw) is available in the first paragraph of the results section as well as graphically in Figure 2 (young). It is not noted how many trials were conducted to acquire the maximal strength value. | No sub- analysis available. | There was no significant difference in maximal grip strength between the dominant and non-dominant hands. |
| Lopes, J., Grams, S. T., da Silva, E. F., de Medeiros, L. A., de Brito, C. M. M., & Yamaguti, W. P. (2018) | 80 | Whole | Healthy community adults aged 40-60 ( 40 males and 40 females) | Only one male participant was left handed | Maximal handgrip strength was measured using a hydraulic handgrip dynamometer (SAEHAN SH 5001) seated upright with the arm adducted and the elbow flexed at 90° in accordance with the American Society of Hand Therapists' recommended protocol. Handle position was individually adjusted to each participant's phalangeal length. | Data for maximal handgrip strength is reported in Table 2 (HS) for the dominant and non-dominant hands. The peak value of three acceptable trials were included in the analysis. | Sub analysis by sex is available (Table 1). | The maximal handgrip strength of the dominant hand was significantly greater in the whole study as well as in both male (4.9% greater) and female (15% greater) groups. |
| Morlino, D., Marra, M., Cioffi, I., Sammarco, R., Speranza, E., Di Vincenzo, O., . . . Pasanisi, F. (2021) | 529 | Whole | 529 Italian women aged 23.2 ± 7.0 and stratified by BMI (T1 = BMI 15-17.29; T2 = BMI 17.3-19.9; T3 = BMI 20-25) | Not indicated | Participants performed maximal grip strength exertions against a Jamar handgrip dynamometer while seated with an extended elbow and the shoulder adducted to their side body. | Data are reported in Tables 2 (BMI) and 3 (Age) with different factors separating the measurements. Values included for statistical analysis were the mean of three maximal grip trials per hand. | Sub analysis can be conducted by examining the age range (Table 3) or BMI (Table 2) as factors and percentiles are outlined in addition to means. | Maximal handgrip strength of females was higher for the dominant hand than for the non-dominant hand in all BMI tertiles. |
| Nicolay, C. W., & Walker, A. L. (2005) | 51 | Whole | College students ages 18-33 with no history of upper limb injury | 3 left handed, 48 right handed | Data were collected using a Qubit Systems digital handgrip dynamometer with non-adjustable dual-cylinder handles. Participants were seated upright with the shoulder adducted and the elbow flexed at 90° so that the forearm rested on a table. | Data are displayed in Table 3 outlining the mean maximal handgrip forces overall and for both males and females. Data are from a single maximal exertion for each hand. | Sub-analysis of the data can examine sex differences (Table 3). | Maximal handgrip force from the dominant had was significantly greater than that of the non-dominant hand by ~10%. |
| Oxford, K. L. (2000) | 128 | Whole | 64 males (aged 22 to 57) and 64 females (aged 20-56) split into two same-sex subject groups | Mixed - four females were left handed and three males were left handed | Maximal handgrip strength measurements were taken using a Greenleaf instruments Medical EVAL digital handgrip dynamometer. Grip strength was measured in both seated and standing postures, with the arm adducted and the elbow flexed at 90° while seated for even-numbered participants and standing with a straight adducted arm for odd-numbered participants. | Data for all subjects can be found in Table 1. Three measurements were taken from each hand to obtain a peak grip strength value. | Sub-comparison can be made based on two factors: sex (females in Table 2 and males in Table 3) and testing position (0° or 90° positions). | Data were statistically compared within dominant or non-dominant hands for the effect of testing position, though the dominant side grip strength was stronger for every comparison examined. |
| Pande, S., Shaikh, N., Chutani, A. (2016) | 100 | Whole | Healthy participants aged 18-26 (73 males and 27 females) | Not indicated | Data can be found to compare the dominant hand strength to the non-dominant for all participants (Table 2) and comparisons can be made between the dominant and non-dominant hands of males and females using Table 4 and Table 5 in conjunction. the mean of three maximal attempts was used for statistical analysis. | Comparison can be made between sex. | Maximal handgrip strength in the dominant hand (41.75+ 10.822) was found to be more than that of the nondominant hand(32.855+9.013) in both male  and female study group. | Maximal handgrip strength in the dominant hand (41.75+ 10.822) was found to be more than that of the nondominant hand(32.855+9.013) in both male  and female study group. |
| Rajendran, N. (2010) | 60 | Whole | 30 male and 30 female participants aged 18-40 years, who were injury free at the time of collection | Not indicated | A Lafayette Hand Dynamometer was used to quantify maximal grip strength while participants stood with a relaxed and slightly abducted shoulder and a slightly flexed elbow. The handle length was self-selected by participants for comfort. | Data (kg) is available in Table 4. Three trials were collected unless one was greater than 10% different in which case a fourth maximal trial was collected. | Sub-comparison can be made based on participant sex (Table 4) | The dominant limb maximal grip strength was greater only in female participants (Male grip: dom 6.1% greater; female grip: dom 9.7% greater), however, the statistically analyzed strength data were not raw (normalized to body weight) values so not directly applicable to other results. |
| Severijns, D., Lemmens, M., Thoelen, R., & Feys, P. (2016) | 38(19) | Subset - healthy controls used to compare to patients with multiple sclerosis | Healthy age (56 ± 13 and gender (13 female, 6 male)-matched controls | 17 right-handed and 2 left-handed participants | Maximal handgrip exertions were collected with a digital E-link hand dynamometer on three testing days. T0 indicated exertions from a fully rested state. Participants were seated upright with the arm adducted and the elbow flexed at 90° in accordance with the American Society of Hand Therapists recommended protocol. | Maximal handgrip strength data are located in Table 1. For a more detailed breakdown based on time of exertion one can examine Table 2 although some fatigue is incurred after T0. Data were collected from the higher of two maximal trials. | No sub-analysis available. | Dominant hand grip strength was ~7.5% stronger than the non-dominant hand, however it is not indicated if this is statistically significant. |
| Smolander, J. (1994) | 26 | Whole | 13 railroad installation workers ( aged 42 ± 11 years) who perform heavy manual tasks and 13 office workers (aged 38 ± 10 years) | Not indicated | Handgrip strength was quantified using a clinical manometer (Martin Vigorimeter). | Maximal handgrip results can be found in Table 2. No indication of how many attempts participants were given to get the maximum value. | Further comparison can be made between office worker and manual labourers. | There was no significant handgrip strength difference between office workers and manual workers. Interestingly the strength of the non-dominant limb was significantly greater than the non-dominant limb in the manual workers where the office workers showed no difference between the hands. |
| Tsang, R. C. C. (2005) | 544(521) | Subset - all age groups other than the 60-70 range | A convenience sample of healthy Hong Kong Chinese adults | Not indicated | Participants were seated upright with the arm adducted and the elbow flexed at 90° while the posterior aspect of the forearm was supported by a plank. A Jamar handgrip dynamometer was used to quantify maximal grip strength with the handle at the 2nd position. | Maximal grip strength or the dominant hand (Table 3 mean, Table 5 maximum) and the non-dominant hand (Table 4 mean, Table 5 maximum ) were recorded for three measurements and both mean and maximal values are listed across the age range. Note that age 60-70 is not used for this investigation. | Additional comparisons can be made by sex, age range and percentiles within each group are also listed (Tables 3,4,5, and 6). | No statistical comparison between dominant and non-dominant hands was provided for the entire age range. Differences range but strength was generally 6-8% greater in the dominant hand. |

**Table 1B: Hand grip strength in right vs left hands**

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| Paper | Total n (n of subset) | Whole study or control group/subset | Description of population | Participants' handedness | Description of exertion(s) | Data reported and location in manuscript | Additional sub-comparisons available | Key Info Summary |
| Alkurdi, Z. D., & Dweiri, Y. M. (2010) | 20 | Whole | Twenty healthy male university students aged 20-21 | Not indicated | Participants squeezed a solid handgrip transducer (non-adjustable, ADInstruments) with the arm and elbow at various positions (Table 1) such as arm slightly abducted with the elbow straight, arm slightly abducted with 90° of elbow flexion, etc… The trials were a maximal grip followed by a 50% MVC hold to fatigue. | Data for maximum right (Table 3) and left (Table 4) handgrip strengths (N) are available by individual participants under the 'Max' heading for each position. | Additional sub-comparisons can be made between right and left hands across the various shoulder and elbow positioning (Position 1-7, in Tables 3 and 4). | The right hand showed significantly greater grip strength compared to the left across all arm positions. |
| Axelsson, P., Fredrikson, P., Nilsson, A., Andersson, J. K., & Karrholm, J. (2018) | 499 (330) | Subset - only the 26-35, 36-45, 46-55 and 56-65 age groups can be used for this investigation | Approximately 261 (age ranges broken down graphically in Figure 1) Swedish volunteers free of musculoskeletal injury | Mixed, outlined in Appendix A | Participants maximally gripped a Jamar handgrip dynamometer while standing with the shoulder slightly abducted and 90° of elbow flexion. | Maximal manual lifting strength data are available graphically in Appendix B. | Sub-comparisons can be made by sex or age range. | Because many age ranges are excluded for the purposes of this analysis, Results based on group means reported in the study do not apply. Data needs to be evaluated in more detail. |
| Balogun, J. A. (1987) | 50 | Whole | Fifty female students enrolled in a physical therapy program aged 21.2 ± 1.7 years | Not indicated | Handgrip strength data were collected using a Jamar dynamometer while subjects were standing with a straight elbow and arm slightly abducted. | Right and left maximal handgrip strength (kg) is available in Table 1 (Mean ± SD) in addition to other descriptive statistics. Data included in means is the peak of two maximal trials for each hand. | No sub-analysis available. | Right hand grip strength was significantly greater than that of the left hand. |
| Cetinus, E., Buyukbese, M. A., Uzel, M., Ekerbicer, H., & Karaoguz, A. (2005) | 47 | Partial | 47 non-diabetic control subjects comprised of homemakers, civil servants and retirees. 19 males and 28 females aged 46.93 ± 10.2 | 38 right-handed, 6 left-handed and 3 ambidextrous | Maximal handgrip strength was collected with a calibrated Jamar Dynamometer. Participants were seated upright in a chair with the upper arm adducted against the side body and the elbow flexed at 90°. | Table 3 outlines the handgrip strength (kg) of the right (dominant) and left (non-dominant) hands of control patients. | Further analysis can be conducted by examining the handgrip strength as the jamar handle is moved between the first, second, and third settings (Table 3). Data are the mean of maximal handgrip of three trials on each hand. | Strength for handgrip was significantly higher in the dominant hand. |
| Kim, C. R., Jeon, Y. J., Kim, M. C., Jeong, T., & Koo, W. R. (2018) | 7969 (2130) | Subset - only healthy young control group aged 30-39 was used for this investigation - other groups did not have sample size indicated | Healthy Koreans across the lifespan (>10 years old) | Mixed, data on distribution available in Table 1 | Maximal grip strength data were obtained with a TKK 5401 digital grip strength dynamometer. Participants were standing upright with feet shoulder width apart and holding the transducer with a straightened arm at their side. | Extensive data across the lifespan is provided in Table 2 (males) and Table 3 (females). Data are listed as the right hand, left hand and dominant hand grip strength, however, data for the non-dominant hand is not listed. The average of three trials for each hand was recorded and used for statistical analysis. | Subanalysis is available by examining the separate age groups provided from 20-65 years old in 5-year increments or further by sex, table 2 for males and table 3 for females. | Much of the statistical analysis is comparing young and old ages to see the change in handgrip strength across the lifespan. However, it is noted in the discussion that the finding of this study, that the right hand is significantly stronger than the left, are in line with previous research. |
| Liao, K. H. (2014) | 200 | Whole | 200 participants consisting of males (117) and females (83) between the ages of 18 and 27 | Not indicated | Maximal grip strength data were collected using a Takkei hydraulic grip strength dynamometer and a fixed handle position. Participants exerted while seated upright and the dynamometer and arm at their side with a straight elbow. | Right and left hand maximal grip strength (kg) is noted in Table 5. The values included in group means (B) are the peak of five exertions for each arm, however trial by trial data are also available (BxC). | Sex differences (AxB) and trial by trial (sequence of force application)(BxC) differences in maximal grip strength can also be compared between the limbs or both factors together (AxBxC). | The right hand was significantly stronger than the left grip force however there were no effects of sex or sequence of force application. |
| Lo, V. E., Chiu, Y. C., Tu, H. H., Liu, C. W., & Yu, C. Y. (2019) | 198 | Whole | Male (n=99) and female (n=99) operators and/or engineers working on a production line for at least 6 months in the manufacturing industry in Central Taiwan. | Mixed (breakdown in Table 1) | Participants performed maximal handgrip testing against a Jamar digital handgrip dynamometer (G200) with the shoulder at 0° flexion and 0° abduction and the elbow at 90° flexion. | Data are reported (Table 2) is the mean force (kgw) exerted for the task during the middle 3s of a 5s maximal contraction and a mean of 3 trials. | Data are displayed as means for each hand (right/left) but also broken down by task and age group in tables 4 (males) and 5 (females). | This study found maximal handgrip strength was significantly greater on the right hand compared to the left when data were collapsed across sex. |
| Louhevaara, V., Hakola, T., & Ollila, H. (1990) | 32 | Whole | Thirty two male full-time postal parcel sorters aged 34±7 from five different sorting sites with 9±5 years experience on the job | Not indicated | Maximal handgrip was assessed with participants in a seated position with the arm straight and slightly abducted from the side. | The maximal strength (kPa) obtained from the peak of the two trials is reported in text in section 3.4 'maximal muscle strength and endurance' as well as in Table 7. Only pre-working data ('Before') should be used for comparative analysis. | Data can be also be analyzed by sorting centre (A,B,C,D,E or All, Table 7). | Statistical analyses were only performed on the difference in strength before and after a work shift, but when collapsed across sorting centres mean grip strength was only ~1.7% greater in the right hand. |
| Mathiowetz, V., Kashman, N., Volland, G., Weber, K., Dowe, M., & Rogers, S. (1985) | 628 (467) | Subset - not interested in three age groups with participants 65+ years old | Volunteers(n=628 total) from across a variety of socioeconomic and occupational groups in the Milwaukee ,WI region as long as they were without pain or injury. | Mixed (breakdown for each age group and between sexes in Table 1) | Participants were tested for maximal grip strength (Jamar Dynamometer - second handle for all participants)For all tests the shoulder was at the side while the elbow was flexed at 90°, wrists were ulnar deviated between 0° and 30° and dorsiflexed between 0° and 30°. | Data are reported in table format such that mean force (lbs) is reported between right and left hands for Grip strength (Table 2), Tip Pinch (Table 3), Key pinch (Table 4) and palmar pinch (Table 5). The text mentions that three tests were conducted for each participant and condition; however it does not specify if the peak or average was used to calculate the mean. | Data are further broken down by sex and age group within each table (tables 2, 3, 4, & 5). | The right hand is significantly stronger across both sexes with a few exceptions.when a sub-analysis was performed between right-handers and left-handers they demonstrated the same right/left pattern of strength, however this data are notably 7% of the total sample size and includes ages over 65 so should not be relied on for our analysis (Table 7). |
| Niebuhr, B. R., Marion, R., & Fike, M. L. **(1994)** | 33 | Whole | Thirty three healthy occupational therapy students (28 female and 5 male) aged 24.4±5.4 years | 29 subjects were right-handed and four were left-handed | Data were collected using a PC5030PT computerized Jamar dynamometer and along with several other measures peak force was recorded from the output tracings of 5s maximal handgrip contractions. Data were smoothed with a 2 datapoint moving average to eliminate outlier spikes. | Peak handgrip strength values (lbs) are displayed in table 2 for the right and left hands. | This data can also be further analyzed by session in which it was collected (1, 2, or 3, Table 2). | The maximal handgrip strength of the right hand was significantly greater than the left hand with an approximately 7% difference. |
| Orr, R., Pope, R., Stierli, M., & Hinton, B. (2017) | 169 | Whole | Participants were healthy police recruits currently at a police college with a minimum age of 18 years and 4 months | Not indicated | Maximal handgrip strength of the right and left hands was assessed with participants in a seated position with the arm straight and slightly abducted from the side. Values were collected to the nearest 1 kg using a TTM Original handgrip Dynamometer. | Data for maximal grip strength(kg) is reported in table 1 as well as in text at the beginning of the results section. Values used in group means were the peak of two tests, however if those two tests were greater than 5% different then a third trial was collected. | Further sub-analysis is available by comparing grip strength when binned into 5kg strength blocks against the recruits' firearms score in figures 2 (left hand) and figure 3 (right hand). | There was no significant difference in maximal grip strength between the right and left hands for the police recruits. |
| Shechtman, O., Davenport, R., Malcolm, M., & Nabavi, D. (2003) | 180 | Whole | 180 healthy participants (80 male, 100 female) aged 18 to 49 years | 90% of subjects identified as right-handed via self reporting | The BTE Primus handgrip dynamometer with attachment 162 and the Jamar handgrip dynamometer were used to quantify the maximal grip strength of the right and left hands independently. The Participants were tested in a seated position with the shoulder of the testing arm adducted and the elbow flexed at 90°. | Data for maximal handgrip strength (Table 4) is only presented in raw values for the BTE-Primus ((kg) while values from the Jamar dynamometer were to assess the reliability and are presented as correlation coefficients. Values used in group means are the average of the 3 trials at each condition (12 trials across all conditions). | Sub-comparisons can be made between grip strength values based on sex, age range (18-19, 20-29, and 30-49) and posture (sit/stand). | The right hand was significantly stronger than the left hand across all participants. Furthermore, right-handers were 10% stronger with their dominant hand while left-handers were only 1% stronger with their dominant hand. |
| Thomas, E. M., Sahlberg, M., & Svantesson, U. (2008) | 41(20) | Whole but two separate analysis groups - all participants together and only 20 females at baseline before a training intervention | Twenty-seven healthy females (aged 24.6 ± 2.6) and 14 males (aged 25.9 ± 3.0) | Not indicated | Participants' maximal handgrip strength was quantified using the Grippit electronic adjustable dynamometer. The Participants were tested in a seated position with the shoulder of the testing arm adducted and the forearm supported by the Grippit rest and elbow flexed at 90°. | Two datasets of maximal grip strength (N) are available from this study as there was a larger cohort comparison of grip strength with male and female participants (Table 1) and a smaller subset of 20 females that participated in a training protocol. For the latter, only the baseline measurements should be used and for both groups only the 'MVC' values and not the sustained MVC. | Comparisons can also be made between sex from values located in Table 1. | When collapsed across handedness and sex the right hand grip strength was significantly greater than that of the left hand (6-9%) However, when accounting for only right hand dominant individuals, the dominant (right) hand was 8-11% stronger. |
| Yamauchi, J., & Hargens, A. (2008) | 9 | Whole | Healthy participants aged 31.8 ± 7.3 | Not indicated | Participants' maximal handgrip strength was quantified prior to the static vs dynamic testing protocol using a Jamar  Hydraulic Hand Dynamometer. Participants stood upright with a straight arm adducted and the dynamometer at their side before exerting for 3s. | Results for maximal handgrip strength (kg) are presented in the text just prior to the discussion. Group means were calculated from the mean of three maximal trials per participant. | No sub-comparison available. | There was no significant difference between the strength of the right and left hands. |

**Table 1C: Hand grip strength in studies with combined dominant/non-dominant and right/left reporting**

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| Paper | Total n (n of subset) | Whole study or control group/subset | Description of population | Participants' handedness | Description of exertion(s) | Data reported and location in manuscript | Additional sub-comparisons available | Key Info Summary |
| Ache Dias, J., Wentz, M., Külkamp, W., Mattos, D., Goethel, M., & Borges Júnior, N. (2012) | 40(18) | Subset - control group of non-judokas | Eighteen Brazilian healthy physical education students with no musculoskeletal disorders | All right handed by self-report | The Participants were tested in a seated position with the shoulder of the testing arm slightly adducted and the elbow flexed at 90° to grip the custom strain gauge-instrumented dynamometer. Handle length was set to 55mm as the optimal grip span for all participants. | Peak grip force (PGF) data (N) is located in Table 2 (right side, non-judokas). Means are reflective of a single maximal trial for each hand. | No sub-comparison available. | There was no effect of hand dominance on on grip force. |
| Aoki, H., & Demura, S. (2008) | 15 | Whole | Young, healthy males aged 22.1 ± 0.7 years free of any upper limb injury | All right handed | Participants were seated with their arm flexed 90°, in 0° plane of elevation so it was outstretched inline with the shoulder in front of the body. A height-adjustable table met the axilla to stabilize the body and support the posterior aspect of the upper arm and forearm while participants gripped an adjustable handle connected to a load cell and their 2nd interphalangeal joint was flexed at 90° around the handle. | Table 2 presents the maximal hand grip strength (kg)between the dominant (right) and non-dominant (left) hands. The highest value of two maximal trials was used in group means, and this was tested again 2-3 days later to confirm the results. | No additional comparisons available. | The dominant arm handgrip strength was significantly stronger than the non-dominant hand. |
| Aoki, H., & Demura, S. (2009) | 30 | Whole | Young, healthy males (22.1 ± 0.7 years) and females (22.4 ± 1.0 years) free of any upper limb injury | All right handed | Participants were seated with their arm flexed 90°, in 0° plane of elevation so it was outstretched inline withe the shoulder in front of the body. A height-adjustable table met the axilla to stabilize the body and support the posterior aspect of the upper arm and forearm while participants gripped and adjustable handle connected to a load cell and their 2nd interphalangeal joint was flexed at 90° around the handle. | Table 1 presents the maximal hand grip strength (kg)between the dominant (right) and non-dominant (left) hands. The highest value of two maximal trials was used in group means, and this was tested again 2-3 days later to confirm the results. | Results are displayed for dominant and non-dominant hands for both sexes. | Hand Grip strength of the dominant hand was significantly greater than the non-dominant arm in both males and females. |
| Chatterjee, S., & Chowdhuri, B. J. (1991) | 99(40) | Subset - only three age groups reported meet the inclusion criteria (20-29, 30-39, and 40-49) | 40 healthy but sedentary male participants aged 20-49 | All right handed | Participants were seated upright with the upper arm against the side body and the elbow flexed at 90°. Maximal handgrip strength was quantified to the nearest 0.1kg using a INCO handgrip dynamometer. | Maximal handgrip values for the right (dominant) and left (non-dominant) hands are displayed in Table 1 for each age group. Values included in group means are the peak value of two maximal trials collected. | Additional comparison of strength data between age groups (20-29, 30-39, and 40-49) is available. | The right (dominant) hand was significantly stronger than the left (non-dominant) hand in the 20-29 and 30-39 age groups but this was snot the case in the 40-49 age group. |
| Cornwell, A., Khodiguian, N., & Yoo, E. J. (2012) | 80 | Whole | 80 healthy adults adults (males aged 32.1 ± 12.7; females aged 28.2 ± 9.1) | 40 left handed (12 male and 28 female) and 40 right handed participants (19 male and 21 female) | Participants were seated upright with the upper arm against the side body and the elbow flexed at 90°. Both Bilateral and Unilateral MVCs were performed but only Unilateral MVCs should be analyzed for maximal grip strength. | Peak handgrip forces (N) are displayed in Table 2 under Unilateral headers. | Further analysis is provided by separating right-handers and left-handers to analyze the effect of hand dominance on absolute strength asymmetry (Table 2). | The dominant hand is significantly stronger in right-handers however there is not the same effect in left-handers. |
| DeJong, S. L., & Lang, C. E. (2012) | 31(15) | Subset - control group not age-matched to stroke group | 15 healthy young volunteers between 20 and 35 years old | All right handed | Maximal grip force was measured using two BIOPAC digital handgrip dynamometers (SS25), one in each hand and acquired with LabVIEW software. Participants were seated in a chair with 30 degrees of flexion, abduction, and internal rotation at the shoulders, 60 degrees of flexion at the elbows. However reporting in the results indicates Jamar grip force dynamometers were used for control participants. | Group means are indicated in-text in the second paragraphs of the results section. | No sub-comparison available. | The non-dominant (left) side grip force was 93.3% that of the dominant (right) grip force. |
| Ertem, K., Harma, A., Cetin, A., Elmali, N., Yologlu, S., Bostan, H., & Sakarya, B. (2005) | 877 | Whole | Students and staff from a Turkish university aged 21.14 ±2.09 free of upper limb injuries | Mixed - 814 right-handed and 63 left-handed participants (Table 1) | Participants' maximal grip strength was tested with a Jamar handgrip dynamometer. They were seated upright with the arm adducted and the elbow flexed at 90° in accordance with the American Society of Hand Therapists recommended protocol. Data were collected for all participants at the second handle position. | Detailed descriptive statistics are reported in Table 1 outlining left and right grip strength (kg) for both left-handers and right-handers. Additionally, GSav provides the average grip strength over three maximal trials and GSmax provides the peak grip strength. | Sub-comparison is available between the three trial average and the single trial peak grip strength recorded. | The dominant hand was only significantly stronger than the non-dominant hand in left-handers (~7%) when compared to right-handers. |
| Gordon, N. M., Rudroff, T., Enoka, J. A., & Enoka, R. M. (2012). | 20 | Whole | 20 healthy adults (15 males, 5 females) aged 23 ± years | Ten left handed, ten right-handed | Handgrip assessed in accordance with Marmon et al. 2011 protocol - Subjects were seated upright in a chair for the handgrip measurement with the arm to the side and the elbow flexed to 90°. | Handgrip forces (kg) for both left and right hands in addition to dominant and non-dominant hands are displayed in the text at the beginning of the results section. Three maximal grip force trials were averaged to get the individual maximum value. | No additional sub comparisons available. | No significant differences between the dominant and non-dominant grip strength of right-handers and left-handers respectively. |
| Hanten, W. P., Chen, W. Y., Austin, A. A., Brooks, R. E., Carter, H. C., Law, C. A., . . . Vanderslice, A. L. (1999) | 1182 | Whole | 553 male and 629 female participants with no history of upper extremity disorders ranging from 20 to 64 years old | Mixed but outlined in results (Table 1 vs Table 2) | Participants stood upright while exerting against a calibrated Jamar dynamometer with their shoulder adducted to their side, elbow flexed at 90°, wrist in a neutral posture and the handle at the second location. | Table 1 (right and left) and Table 2 (dominant and non-dominant) contain peak grip strength values (lbs) across sex and a variety of age ranges with a very robust sample size. | Additional sub-comparisons can be made between sex or age bins (every 5 years, Table 1 & Table 2). | For right-handed participants, the right (dominant) hand was about 10% stronger than the left. This statistically significant difference was not seen in left-handed participants where more exhibited greater strength in the right (non-dominant hand) (Table 3 displays this effect). When collapsed for handedness and age the right hand is significantly stronger across the population. |
| Kubota, H., Demura, S., & Kawabata, H. (2012) | 100(50) | Subset - only the young women's group data are eligible for inclusion | Fifty healthy young women (age 20.9 1.9  years | All right handed | Data were collected with a Smedley’s mechanical handgrip dynamometer. The grip was adjusted to the participant's comfort and measures were collected with participants seated and the arm straight and adducted at the side of the body. | Data are available on the left side of Table 2 comparing maximal grip strength for the dom (right) and non dom (left) hands. Two measurements were conducted and the peak value was used as the maximum handgrip value in statistical analyses for each participant. | No sub-comparison available. | The dominant (right) hand had a significantly greater grip strength compared to the non-dominant (left) hand in young adult females. |
| Lee, K. S., & Hwang, J. (2019) | 164 | Whole | 100 male and 64 female healthy undergraduate student participants aged 22.79 ± 2.11 | All right handed | A Jamar handgrip dynamometer was used to quantify handgrip strength with the handle positioned at the second or third position based on the participant's anthropometry. Strength was quantified across a variety of postures (sitting, standing) and forearm positions (pronated, neutral, supinated). | Data comparing maximal grip strength (N) between the hands is available in Table 3. The trials were repeated three times to obtain an average maximal isometric gripping strength value. | No sub-analysis available. | There was a significant effect of hand dominance with the right (dominant) hand grip strength about 7N greater than left (non-dominant) hand grip strengths. |
| Matsuoka, J., Berger, R. A., Berglund, L. J., & An, K. N. (2006) | 51 | Whole | 51 healthy volunteers (24 males, 27 female) aged 22 to 45 years old | All right handed | Maximum grip, pronation, and supination strengths were quantified using a custom dynamometer. With participants seated upright, they grasped a handle with a power grip and exerted rotational forces that were quantified by a Torque cell transducer (transducer techniques). Participants exerted pronation and supination forces from starting positions of neutral, supinated and pronated. | Peak pronation and supination values are reported in table 2 for all participants. Results are displayed between the right (dominant) and left (non-dominant) arms for many forearm starting orientations for both pronation and supination. Data reported for analysis is the average peak torque across three maximal effort trials at each condition. | In addition to the peak supination and pronation forces from a neutral grip, sub-analyses can be conducted on the other forearm orientations (pronounced and supinated). Table 3 displays results for only male participants and table 4 for only female participants. | The non-dominant (left) arm's torque values were between 85% and 95% of the peak torque values of the dominant (right) arm. For all but the resisted supination from a supinated position were there was no difference between the limbs. |
| Noguchi, T., Demura, S., & Aoki, H. (2009) | 50 | Whole | Healthy young men 21.1 ± 2.6 years | All right handed | Participants performed maximal isometric handgrip in a standing posture with the shoulder adducted and an extended arm against the side body. A digital Smedley type handgrip mechanical dynamometer (Sakai EG-210) was used for measurements). | Maximal hand grip strength (MHGST, N) is available in Table 1. Data were collected from two maximal grip strength exertions to obtain the peak value for statistical analysis. | No sub-analysis available. | The dominant hand was significantly greater than the non-dominant hand (~7.8%) however using a threshold for strength-based dominance they concluded only 34% of participants had a superior hand while 46% and 66% showed no strength superiority. |
| Seitz, K. (2001) | 20 | Whole | Four males and 16 females aged 26-59. Participants were split into equal groups of 10 and matched to handedness with 2 males and 8 females for both right-handers and left-handers | Mixed, indicated in results tables | Maximal grip strength was collected using a Jamar dynamometer with participants seated, shoulder adducted and the elbow flexed at 90. Participants were tested in a specific sequence based on grouping which is noted (A - dominant tested first or B - non-dominant tested first). | Data for maximal handgrip strength (kg) is found in Table 5 (dominant hand) and Table 6 (non-dominant hand). Values used in statistics were the peak value obtained from three trials. | Further analysis can be conducted based on the sequence of the trials (A - dominant tested first or B - non-dominant tested first). | No significant difference between hands in the maximal grip strength of right-handers vs left handers. |
| Tsutsumi, K., Tanaka, M., Shigihara, Y., & Watanabe, Y. (2011) | 12 | Whole | Healthy male participants (aged 26.3 ± 7.0 years) all moderately active but not trained | All right handed | Maximal handgrip strength was tested using a TOEI LIGHT ST-100 dynamometer before performing fatiguing contractions. no comment is issued about testing posture for maximal baseline contractions. | Data are displayed graphically (Figure 1) with mean maximal handgrip strength (kg) displayed for the right (dominant, a) and left (non-dominant, b) hands. Note that only the 'Before' Data should be used to examine rested maximal strength values. | No sub-analysis available. | No direct statistical comparison of right vs left maximal grip strength (only to post-fatigue values), however, there is a ~ 10% difference between right (dominant) and left (non-dominant) values. |

**Table 2A: Isometric joint strength in dominant vs non-dominant hands**

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| Paper | Total n (n of subset) | Whole study or control group/subset | Description of population | Participants' handedness | Description of exertion(s) | Data reported and location in manuscript | Additional sub-comparisons available | Key Info Summary |
| Hernandez, J. P., Nelson-Whalen, N. L., Franke, W. D., & McLean, S. P. (2003) | 41(21) | Subset - only the young participant group | Healthy and active college-aged adults aged 22 ± 0.9 years. (n=16 female, n=5 male) | Not indicated | Participants performed seated isometric elbow flexion with both arms slightly flexed and the posterior aspect of the upper arm resting on a pad while a cuff was affixed to the distal forearm. Cables restricted the elbow to 90° of flexion and force was recorded using a load cell in line with cables (interface Inc.). For some contractions participants contracted both limbs simultaneously but unilateral contractions will be used for this analysis. | Data are represented graphically in Figure 2, 100% bars 2 and 4 represent the unilateral dominant and non-dominant absolute strengths of the young population respectively. Three maximal exertions were obtained but it is not clear if all three or the peak contributed to the group means displayed in Figure 2. | No additional sub comparisons available. | No significant differences between the strength of the dominant elbow flexors and non-dominant elbow flexors when contracted unilaterally. |
| Howatson, G., Glaister, M., Brouner, J., & van Someren, K. A. (2009) | 11 | Whole | Physically active male subjects aged 30 ± 6 years and free of injuries | Not indicated | Elbow flexion strength testing of the dominant and non-dominant limbs was tested using a Biodex isokinetic dynamometer and randomized between days. Participants were seated with the shoulder and hips strapped and isometric elbow flexion strength was assessed with the elbow flexed at 45°. Isokinetic torque was assessed at two speeds: 60°/s and 210°/sec. | Table 2 presents the torque data between the elbow flexors at the various conditions and Figure 2 graphically represents the elbow flexor torque (Nm) between the dominant (bottom) and non-dominant (top) limbs across many trials. Participants' data are gravity corrected to eliminate the weight of the limb and the values reported for each 'trial' of the isokinetic test are the peak torque generated over three maximal trials compared to a single exertion of the isometric. | Additional reliability comparisons as measurements are reported for five trials for each measure. | This investigation did not statistically test for strength difference between the limbs but rather the repeatability of maximal measures within each limb, though from observing the data there appears no difference between the elbow flexion strength of the dominant or non-dominant limb under isometric or isokinetic conditions. |
| Kramer, J. F., Nusca, D., Bisbee, L., MacDermid, J., Kemp, D., & Boley, S. (1994) | 43 | Whole | Twenty-one healthy and injury-free males (aged 29.7±6.9 year) and twenty-two females (aged 28.4±5.7 years) | Not indicated | Pronation/supination strength asymmetry was tested on two dynamometers separately and in randomized order on the BTE WS20 work simulator and the Cybex 340 dynamometer. Participants in both dynamometers were positioned with the shoulder at 10° of abduction, 5-10° of flexion, and 0° of rotation; the elbow at 90° of flexion; the forearm parallel to the floor and in 10° of supination (thumb vertically up); and the wrist in neutral flexion /extension however the BTE was conducted standing and the Cybex tests conducted seated. Participants gripped a handle with a medium power grip to move the dynamometer head. | Data are displayed in Table 4 outlining forearm pronation and supination strength (Nm) of the dominant and non-dominant limb. Two maximal tests were quantified for each measurement condition and data displayed is the peak torque (Nm) from each effort individually or as an average of the two trials (Overall). | Reliability comparisons can be made between two trials (Occasion 1 and Occasion 2) Displayed in Table 4. | This investigation also did not statistically test for strength difference between the limbs but rather the repeatability of maximal measures within each limb. However, from the non-dominant/dominant strength ratio data presented in Table 3 and raw data in Table 4 that the dominant limb was approximately 10% stronger than the dominant limb in both pronation and supination across both dynamometers and both trials. |
| Noffal, G. J. (2003) | 59(43) | Subset - only the non-thrower group. The study compared collegiate throwing athletes to non-athlete controls | Participants were active college students not participating in overhand throwing sports and free of musculoskeletal injuries aged 20.1±1.3 years | Not indicated | Participants performed eccentric and concentric internal and external shoulder rotation for this study. Measures were taken using a Biodex isokinetic dynamometer at 300°/sec and the participant laying on their back with the shoulder abducted 90° and the elbow flexed 90° while the hand grasped a handle. No gravity correction was used to adjust the values. | Table 1 displays the comparison of mean torques between the dominant and non-dominant limb (Nm). Note to only use the Non-Thrower comparisons to compare strength between limbs for both eccentric and concentric external and internal shoulder rotation. The values contained in the means are the peak value of 5 maximal trials for each condition per participant. | Sub comparisons can be made between concentric and eccentric components of movement via data available in Table 1. | The study only tested external-to-internal rotation strength ratios for statistical significance. Examining the data there appears to be a slight (~8%) strength difference with the dominant arm stronger than the non dominant across all movement conditions. |
| Sato, S., Yoshida, R., Kiyono, R., Yahata, K., Yasaka, K., Nunes, J. P., ... & Nakamura, M. (2021) | 32 (8) | Whole when pre training values are used. Post training values can only be used for non-training controls (n=8) | Thirty-two healthy university students (19 males and 13 females) with no history of structured resistance training in the past 6 months | All participants except one (in the FLE group - training at more flexed joint angles) were right handed | Elbow flexion torque was tested with a Biodex isokinetic dynamometer. It is not noted if the participant was tested in a seated or supine position but the various angles of muscle tested are denoted in the results. | Strength data are available in Table 1 comparing the dominant (trained arm) to the non-dominant (non-trained arm). Elbow flexion strength (Nm) is displayed for a variety of maximal contraction conditions spanning joint angles for four isometric measurements (MVC-ISO60 - MVC-ISO130), two speeds for isokinetic contractions (MVC-CON60 & MVC-CON180) and eccentric contraction (MVC-ECC). Only 'Pre' data should be examined as it is a strength comparison between the limbs on the same day of experimentation. Peak values obtained for data analysis are the highest of two isometric contractions or five isokinetic contractions. | Many sub-analyses are available between contraction types (isometric, concentric, eccentric), joint angle (isometric 10°,50°,90°,130°), and movement speed (contentric 60°/s and 180°/s). | Statistical results are not noted for each condition's strength comparison between limbs at pre-training, however, it is noted that there were no significant effects of any kind for the control group. |
| Schoen, M. S. (1995) | 52(25) | Subset - only the non-thrower group. The study compared collegiate throwing athletes to non-athlete controls | Twenty-five undergraduate students with no immediate history of shoulder dysfunction | Not indicated | A Cybex II Isokinetic dynamometer was used to quantify isokinetic shoulder internal and external rotation torques with participants in a standing position. Participants were placed into slight abduction and a neutral shoulder position with the elbow flexed at 90° and performed maximal trials five times each at speeds of 60, 180, and 300°/s. There was no indication if gravity correction was used. | Data can be found in Table 6 comparing group mean torques (Nm) between the dominant and non dominant shoulder rotators of the non-throwing control group. Values used for mean calculations were the peak value from the 5 isokinetic contractions. | Additional comparisons can be made by isokinetic contraction speed with data displayed for 60°/s, 180°/s and 300°/s for each condition. | The dominant limb was significantly stronger in all conditions except the 300°/s external rotation with an average difference of approximately 9%. |
| Smedley, R. B. (2001) | 254 (226) | Subset - only the non-thrower group. The study compared collegiate throwing athletes to non-athlete controls | 226 non-throwing college students (114 males: 20-24 years of age, 114 females: 19-23 years of age) with no upper limb injury | Not indicated | The strength of the dominant and non-dominant shoulders were quantified by measuring isokinetic internal and external rotation torque using a Cybex II isokinetic dynamometer. Participants were placed in a supine position with the arm abducted 90° and the elbow flexed at 90°. Maximal strength was tested at 300°/s through the entire range of motion. Gravity correction was not used. | Peak torque values (ft-lbs) from control group internal and external shoulder rotation the five maximal exertion trials are displayed in Table 2. | No sub analysis available. | The strength of the non-athlete shoulder internal rotators was significantly stronger for the dominant limb vs the non-dominant limb. No significant strength asymmetry was indicated for the external rotators. |
| Van Harlinger, W., Blalock, L., & Merritt, J. L. (2015) | 180 | Whole | 180 healthy adult volunteers aged 20-64 (90 males and 90 females) | Four men and Four women were left hand dominant and all ambidextrous were excluded from participation | This study utilized handheld dynamometry (Nicholas Manual Muscle testing Device) to quantify unilateral isometric shoulder, elbow and wrist strengths across a variety of movements for both the dominant and non-dominant limbs. Those movement patterns included shoulder flexion, extension, abduction, horizontal abduction, horizontal adduction, internal rotation, external rotation, elbow flexion and extension, and wrist flexion and extension. Participant orientation for each of these tests can be found in the methods section but are too lengthy to list here. | Strength data (kgs) for all movements can be found in Table 1 (males) and table 2 (females) . All values were collected according to Kendall & Kendall MMT testing parameter recommendations. | Results between the dominant and non-dominant limb can be further analyzed by comparing data across sex (table 1 males and Table 2 females) as well as age (5 year age bins in each table). | The dominant limb was significantly stronger than the non-dominant limb for each movement when data were collapsed across sex and age range. |
| Vanswearingen, J. (1983) | 30 | Whole | 30 healthy and non-athlete college students (26 female and 6 male) with an age range of 20-28 years | Not indicated | Strength of wrist flexion and extension as well as radial and ulnar deviation was tested isometrically and isokinetically (60°/sec) for both pronated and supinated postures. Participants were tested seated in a Cybex II isokinetic dynamometer with the forearm supported and the elbow flexed at 90° while a similar arm posture was adopted for radial and ulnar deviation but the subject was standing to provide the correct orientation to the dynamometer head. | Table 1 contains strength data (torque in ft-lbs) for the dominant (D) and non-dominant (ND) limbs of each individual participant broken down by movement pattern and contraction condition. isometric data are the peak torque of two 5 second maximal trials and isokinetic data are the peak torque during three maximal trials. | Results can be analysed by contraction type and compared between isometric contraction of isokinetic contractions at 60°/sec in the supinated and pronated directions. | Table 4 indicates a significant effect of laterality on strength measures of the wrist extensors and radial deviators but post-hoc analyses to determine individual effects and direction are unavailable. |
| Watson, M. D., Davies, G. J., & Riemann, B. L. (2021) | 30 | Whole | 30 healthy and moderately active young adults aged 18-35 | Not indicated | Shoulder flexion and elbow extension strength were tested with participants seated upright in a Biodex Isokinetic dynamometer. For elbow extension, the shoulder was flexed at ~70° and the posterior aspect was supported by a brace while the hand exerted against the dynamometer arm via a handle. Shoulder flexion was less restricted and performed with the hand grasping a handle attached to the dynamometer arm with the arm fully extended. Testing was performed at 60°/s and 180°/s isokinetically for both joints. | Table 1 displays the peak torque (Nm) data for shoulder flexion and elbow extension strength differences between the dominant and nondominant limb. | Sub-analysis can compare strength between isokinetic contraction speeds of 60°/s and 180°/s (Table 1). | Results show almost symmetrical strength between the dominant and nondominant limbs for elbow extension and shoulder flexion during all speeds. |

**Table 2B: Isometric joint strength in right vs left hands**

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| Paper | Total n (n of subset) | Whole study or control group/subset | Description of population | Participants' handedness | Description of exertion(s) | Data reported and location in manuscript | Additional sub-comparisons available | Key Info Summary |
| Axelsson, P., Fredrikson, P., Nilsson, A., Andersson, J. K., & Karrholm, J. (2018) | 499 (330) | Subset - only the 26-35, 36-45, 46-55 and 56-65 age groups can be used for this investigation | Approximately 261 (age ranges broken down graphically in Figure 1) Swedish volunteers free of musculoskeletal injury | Mixed, outlined in Appendix A | Participants’ maximal forearm pronation torque (pronation or supination) against a Baseline digital wrist dynamometer (Fabrication Enterprises) dynamometer while standing with the shoulder slightly abducted and 90° of elbow flexion (Figure 2). | Maximal forearm torque data are available graphically in Appendix D. | Sub-comparisons can be made by sex, starting forearm orientation or age range. | Because many age ranges are excluded for the purposes of this analysis, Results based on group means reported in the study do not apply. Data needs to be evaluated in more detail. |
| Cortez, P. J., Tomazini, J. E., Valenti, V. E., Correa, J. R., Valenti, E. E., & Abreu, L. C. (2011) | 22 | Whole | 22 healthy subjects between 18 and 19 years old. All participants were soldiers from the same Brazilian Air Force Battalion and physically active | Not indicated | Elbow flexion, shoulder internal rotation and shoulder external rotation were all tested with participants seated upright with the shoulder slightly abducted from the body and the elbow flexed at 90°. Forces were exerted against a handle attached to a custom transducer with the hand in a power grip. | Table 1 and 2 provide mean, median, range and standard deviation strength data (N) for all tests comparing the right and left upper limbs. It is indicated three maximum contractions were performed but not if the average or the largest values was used in the data analysis. | No additional sub-comparisons. | The study did not find any significant differences between right and left upper limb strengths for flexion, internal rotation or external rotation. |

**Table 2C: Isometric joint strength in studies with combined dominant/non-dominant and right/left reporting**

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| Paper | n | Whole study or control group/subset | Description of population | Participants' handedness | Description of exertion(s) | Data reported and location in manuscript | Additional sub-comparisons available | Key Info Summary |
| Alfredson, H., Pietila, T., & Lorentzon, R. (1998) | 22(11) | Subset - 11 non-active female controls to compare with 11 volleyball athletes. | Non-active females aged 24.6 ± 3.3 years with no history of shoulder injury | All right handed | Isokinetic peak torque muscle strength of the shoulder rotators and elbow flexors/extensors was measured using a Biodex isokinetic dynamometer both concentrically and eccentrically. Shoulder internal/external rotation and elbow flexion/extension were measured at various speeds, concentric 60°/s and 180°/s, and eccentric 60°/s in both arms. In the shoulder, the external/internal rotation strength was measured in 90° abduction and with the elbow flexed at  90°. Elbow flexion/extension strength was measured with the shoulder in 90° flexion and 30° abduction. | Shoulder strengths (table 2) and elbow strengths (table 3) display the dominant and non-dominant limb strengths at the various speeds and contraction types (Nm). These data (group means) are comprised of the peak torque from 5 reps (concentric 60°/s), 10 reps (concentric 180°/s) and 3 reps (eccentric 60°/s) respectively. | Table 4 provides internal/external rotation ratios in both dominant and non-dominant arms. | No significant difference in strength between the dominant and non-dominant arms of the non-volleyball players in either shoulder internal/external rotation or shoulder flexion/extension. |
| Aoki, H., & Demura, S. (2008) | 15 | Whole | Young, healthy males aged 22.1 ± 0.7 years free of any upper limb injury | All right handed | Participants were seated with their arm abducted 90°, in 90° plane of elevation and flexed 90° at the elbow. A height adjustable table met the axilla to stabilize the body and support the posterior aspect of the upper arm while a cuff affixed to the forearm was connected to a load cell to quantify maximal elbow flexion strength. | Table 2 presents the maximal elbow flexion strength (kg)between the dominant (right) and non-dominant (left) arms. The highest value of two maximal trials was used in group means, and this was tested again 2-3 days later to confirm results. | No additional comparisons available. | The dominant arm elbow flexion force was significantly stronger than the non-dominant arm. |
| Aoki, H., & Demura, S. (2009) | 30 | Whole | Young, healthy males (22.1 ± 0.7 years) and females (22.4 ± 1.0 years) free of any upper limb injury | All right handed | Participants were seated with their arm abducted 90°, in 90° plane of elevation and flexed 90° at the elbow. A height adjustable table met the axilla to stabilize the body and support the posterior aspect of the upper arm while a cuff affixed to the forearm was connected to a load cell to quantify maximal elbow flexion strength. | Table 1 presents the maximal elbow flexion strength (kg) between the dominant (right) and non-dominant (left) arms. The highest value of two maximal trials was used in group means, and this was tested again 2-3 days later to confirm results. | Results are displayed for dominant and non-dominant hands for both sexes. | Elbow flexion strength of the dominant arm was significantly greater than the non-dominant arm in both males and females. |
| Carpes, F. P., Geremia, J. M., Karolczak, A. P. B., Diefenthaeler, F., & Vaz, M. A. (2012) | 18 | Whole | 18 males (aged 28 ± 6 years)that were free of any upper limb injuries or neuromuscular abnormalities | All right handed | Elbow flexion and extension forces were examined using the Cybex NORM isokinetic dynamometer. The subjects were laid supine and elbow aligned with the dynamometer axis of rotation while the hand gripped a handle. Maximal torque was assessed isometrically with the elbow joint fixed at five different angles: 0°, 30°, 60°, 90° and 120° as well as concentrically at five different angular velocities: 60°/s, 120°/s, 180°/s, 240°/s and 300°/s for both flexion and extension. | Isometric torques are represented graphically for the elbow flexors(top) and extensors(bottom) between the dominant (P) and non-dominant (NP) limbs. Isokinetic strengths are represented similarly in Figure 2 (flexors top and extensors bottom). Participant data reported into group means is the peak value from one of 3 trials at each joint angle. | No additional sub-comparisons are available but the study does calculate the asymmetry index between the limbs for isometric contractions and that is reported separately in table 1. | There was no difference between dominant (preferred) limb and non-dominant (non-preferred) except for during the isometric 90° joint angle task where the dominant was significantly stronger. |
| Carrascosa-Sanchez, J., Slocker, A., Rodriguez, R., Clemente, C., Garcia, J., Fernandez, J., & Gomez-Pellico, L. (2000) | 40 | Whole | 20 young, healthy volunteer males and females (aged 19.4 ± 1.7 years and 19.5 ± 1.1 years respectively) that were free of any upper limb injury | All right handed | A Biodex isokinetic dynamometer was used to assess shoulder abduction/adduction at two speeds 60°/s and 120°/s. | Peak torque and total work at both speeds for the dominant(right) and nondominant(left) arms are reported in Table 1. Peak values are the peak torque achieved during 5 trials at the 60°/s speed and 15 trials at 120°/s. | Additionally, Table 1 displays data separated by sex for sub-comparison. | Data displayed a trend higher for the dominant (right) arm but no statistical comparisons between arms were made as authors were only interested in correlations between total work and peak torque values. |
| Gallagher, M. A., Cuomo, F., Polonsky, L., Berliner, K., & Zuckerman, J. D. (1997) | 60 | Whole | Healthy male volunteers broke up into two groups: 20-30 years old and 50-60. Participants had moderate recreational activity levels but generally nonathletic | All right handed | A Biodex isokinetic dynamometer was used to collect elbow flexion/extension and forearm pronation/supination. For elbow flexion the shoulder was abducted to 90° and placed at 90° plane of elevation. The elbow was flexed and extended in the horizontal plane. For pronation supination the shoulder was at the side and the elbow flexed at 90°. Subjects performed all tests at 90°/s and 180°/s speeds through the full range of motion. | Table 4 presents the data for peak torque from the isokinetic contractions. Although contractions were performed at various speeds and between age groups, the data are pooled when presented as right(dominant) and left (nondominant) lines of data. | Due to the data presentation in table 4 no sub comparison of age or movement speed is available. | The dominant arm was significantly stronger during elbow flexion but there was not effect of handedness for elbow extension or pronation or supination. |
| Gordon, N. M., Rudroff, T., Enoka, J. A., & Enoka, R. M. (2012) | 20 | Whole | 20 healthy adults (15 males, 5 females) aged 23 ± years | Ten left handed, ten right-handed | Elbow flexion forces were collected with participants seated upright and the upper arm by the side and slightly abducted. The elbow was flexed at 90° and the wrist was fixed to a Transducer Techniques SB200 load cell using a tightly fitting orthoses. | Table 1 displays the baseline (initial) elbow flexion forces (N) for both left and right hands in addition to dominant and non-dominant hands. Three to 5 maximal contractions were collected until three were within 5% of one another. then the greatest value was taken as the MVC to be used in the group means. | No additional sub comparisons available. | Right-arm elbow flexion strength was greater than left-arm strength but there was no difference between dominant and non-dominant elbow flexion strength. |
| Karahan, A. Y., Bakdik, S., Ozen, K. E., Arslan, S., Karpuz, S., Yilmaz, N., . . . Cicekcibasi, A. (2017) | 64 | Whole | 30 male and 34 female participants 18-22 years of age with no history of musculoskeletal injury . However this study compared strengths between groups with palmaris longus and without palmaris longus (males: PLM+ n=22, PLM- n=8; females PLM+ n=22, PLM- n=8) so results are displayed according to these subgroups | All right handed | Wrist extension and wrist flexion were quantified using a Microfet2 handheld dynamometer (Hoggan health industries) placed on a table and the forearm was strapped to a wooden block so that the wrist was in a neutral position. While holding a fist, participants extended or flexed against the dynamometer with the back of the hand or the knuckles respectively. | Table 2 (male) and table 3 (female) present wrist flexion and extension strengths (N). Data included in group means is the average of three maximal trials from each participant in that movement. | Results can be grouped or broken down further by the presence or lack of a palmaris longus muscle in both the right (dominant) and left (non-dominant) arms. | There was no significant difference between the right and left limb or the dominant and non-dominant limb within each sex. Furthermore there was no difference in wrist strength between participants in the presence or absence of a palmaris longus muscle. |
| MacDonald, G. Z., Mazara, N., Herzog, W., & Power, G. A. (2018) | 12 | Whole | 12 healthy participants aged 25 ± 3 years | All right handed | Maximum elbow flexion torque was assessed using a HUMAC Norm Dynamometer (CSMi Medical Solutions). Participants were tested in a supine position with the wrist affixed to a metal bar and the axis of rotation of the elbow aligned with the dynamometer arm. The maximum isometric exertions were performed at an elbow angle of 120° (180° = fully extended elbow). | Results are outlined in text under the 'Unilateral isometric elbow flexion' heading of the results section. Maximal values were derived from two unilateral maximal trials for each arm; however it is not indicated if a peak value or average of the two trials was used for subsequent analysis. | No sub-analysis available. | Unilateral right (dominant) elbow flexion produced significantly greater isometric torque than the unilateral left (non-dominant) contractions (60.9 ± 13.6 Nm and 55.0 ± 11.0 Nm respectively). |
| Matsuoka, J., Berger, R. A., Berglund, L. J., & An, K. N. (2006) | 51 | Whole | 51 healthy volunteers (24 males, 27 female) aged 22 to 45 years old | All right handed | Maximum pronation and supination strengths were quantified using a custom dynamometer. With participants seated upright, they grasped a handle with a power grip and exerted rotational forces that were quantified by a Torque cell transducer (transducer techniques). Participants exerted pronation and supination forces from starting positions of neutral, supinated and pronated. | Peak pronation and supination values are reported in table 2 for all participants. Results are displayed between the right (dominant) and left (non-dominant) arms for many forearm starting orientations for both pronation and supination. Data reported for analysis is the average peak torque across three maximal effort trials at each condition. | In addition to the peak supination and pronation forces from a neutral grip, sub-analyses can be conducted on the other forearm orientations (pronounced and supinated). Table 3 displays results for only male participants and table 4 for only female participants. | The non-dominant (left) arm's torque values were between 85% and 95% of the peak torque values of the dominant (right) arm. For all but the resisted supination from a supinated position were there was no difference between the limbs. |
| Ohtsuki, T. (1983) | 10 | Whole | 10 healthy female students aged 20 to 23 years | All right handed | Elbow flexion and extension maximum strength was measured using a custom apparatus that quantified force through a lever arm and a load cell. The participants were seated with the shoulder flexed and the posterior aspect of the upper arm supported on a table. The forearm was oriented vertically so the elbow was flexed at 90° and a cuff affixed to the wrist was attached to a chain that interacted with the force sensing elements. | Results are displayed graphically in Figure 3, but also available in text just prior. Results for right(dominant) flexion and extension as well as left (non-dominant) flexion and extension are available for unilateral exertions. | No sub-analysis available. | There was no significant difference found between the limbs on unilateral tests of elbow flexion or extension strength (right/left or dominant/non-dominant). |
| Perrin, D. H., Robertson, R. J., & Ray, R. L. (1987) | 45(15) | Subset - control subjects | 15 healthy nonathletic male college students aged 18 to 27 years and weighting 64 to 95 kg | All right handed | Shoulder flexion and extension as well as shoulder internal and external rotation was measured with a Cybex II isokinetic dynamometer. Strengths were assessed in a supine position and measures were not gravity corrected. | The shoulder extension strength of the non-athletes is displayed graphically in figure 1 (60°/sec) and figure 2 (180°/sec). However, raw values are not displayed for internal rotation of the shoulder but text in the discussion notes that values were within 5% between the limbs. Strength values from 60°/sec trials were obtained from the highest of four maximal efforts while strength values for 180°/sec trials were obtained from the greatest of 25 maximal repetitions. | No sub-analysis available. | There was no significant difference between the right (dominant) and left (non-dominant) internal and external shoulder rotation strengths at either 60°/sec or 180°/sec. The right (dominant) arm was significantly stronger than the left (non-dominant) arm during should extension at both 60°/sec and 180°/sec, but this was not the case for shoulder flexion. |
| Williams, D. M., Sharma, S., & Bilodeau, M. (2002) | 8 | Whole | Eight healthy volunteers aged 22-43 (five males and three females) | All right handed | Maximal elbow flexion strength was quantified in a custom apparatus with the participants seated. The shoulder was abducted 90°, placed 45° in the plane of elevation and the elbow flexed at 90°. The forearm exerted against a padded cuff attached to a multi-axis force transducer (JR3 Inc). | Data are reported in the text under the results heading 'LQ, endurance time and MVC torque' as well as graphically in figure 1. Three maximal trials were collected of which the highest was used for analysis. | Two right-side (dominant) maximal trials (session 1 and session 2) are available to compare to the single left-side (non-dominant) trial. | There was no significant difference in elbow flexion force between the right (dominant) and left (non-dominant) limbs. |
| Wittstein, J., Queen, R., Abbey, A., & Moorman, C. T., 3rd. (2010) | 20 | Whole | 10 female and ten male healthy volunteers who were regularly active and from a range of professional backgrounds | All right handed | Maximal elbow flexion force and forearm supination force were both quantified using a Biodex isokinetic dynamometer system. | Table 1 displays the dominant (right) and non-dominant (left) elbow flexion and forearm supination strengths. Subjects performed three maximal trials and the peak torque value used for analysis was the maximum across all three trials. | Results are also separated into male (table II) and female (table III) for sex-based analyses. | There was no significant difference between dominant(right) and non-dominant (left) limbs for either elbow flexion strength or forearm supination strength. |

**Table 3A: Multi-joint/functional strength in dominant vs non-dominant hands**

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| Paper | Total n (n of subset) | Whole study or control group/subset | Description of population | Participants' handedness | Description of exertion(s) | Data reported and location in manuscript | Additional sub-comparisons available | Key Info Summary |
| Bourbonnais, D., Carrier, L., & Lepage, Y. (1998) | 23 | Whole | Healthy female college students (n=23) aged 21 to 28 | Mixed, 5 left-handed and 18 right-handed | Maximal contractions of the proximal joint of the thumb were measured in 8 directions(flexion (270°), extension (90°), abduction (180°), adduction (0°), and combined flexion-abduction (225°), flexion-adduction (315°), extension-abduction (135°), and extension-adduction (45°) - shown in Figure 1) using a custom multidirectional dynamometer (Bourbonnais & Duval, 1991). | Data are reported graphically in Figure 2 (dominant (top) and non-dominant (bottom)) and depicts the maximum force of exertions in grams. | Two trials were conducted and Table 1 displays the factor of trial was a test factor, and each trial is represented independently in Figure 2 (white vs black columns). | No significant difference in strength was noted between the dominant and non-dominant thumbs across all movement directions and trials. |
| Bourbonnais, D., Forget, R., Carrier, L., & Lepage, Y. (1993) | 12 | Whole | Twelve healthy women (age: 23.4 ± 1.5 years) | Mixed, three left-handed and nine right-handed participants | Maximal contractions of the proximal joint of the thumb were measured in 8 directions(flexion (270°), extension (90°), abduction (180°), adduction (0°), and combined flexion-abduction (225°), flexion-adduction (315°), extension-abduction (135°), and extension-adduction (45°) - shown in Figure 1) using a custom multidirectional dynamometer (Bourbonnais & Duval, 1991). | Data are reported graphically in Figure 3 (non-dominant) and Figure 4 (dominant). These graphs depicts the mean maximum force of exertions (N) for the group from a single trial for each participant. | Data reporting is broken down into the two sessions separated by at least 2 weeks (black vs grey columns). | There was no significant difference in maximal strength detected between the dominant and non-dominant thumbs. There was a significant effect of direction on the strength capacity but there was no effect of session. |
| Chen, C. Y., McGee, C. W., Rich, T. L., Prudente, C. N., & Gillick, B. T. (2018) | 131(13) | Participants from 13-20 but a 19-20 year old subset was available for analysis | A convenience sample of young adults from a US state fair. | Mixed, total ratios indicated in Table 1, but no handedness data available for age subgroups | A Rotterdam intrinsic hand myometer was used to measure maximal hand exertions during 5 movements: thumb carpometacarpal palmar abduction (abductor pollicis brevis [APB]), index finger metacarpophalangeal (MP) abduction (superficial head of FDI), index finger MP flexion (deep head of FDI and lumbrical of second digit), thumb MP flexion (flexor pollicis brevis [FPB]), and small finger MP abduction (abductor digiti minimi). | Data reported in Table 2 (male) & 3(female) is presented under the 19-20 year old age group and available for all 5 movements both as the maximum of all participants as well as the group mean (N). | Data are broken down by Age group but only a single subgroup is usable under the scoping inclusion criteria. Sub-comparison by sex is available between tables 2 and 3. | Strength of FDI and FPB was greater on the dominant side, and while it included data from ages outside the scope of this review, it is worth noting that there was no effect of age on any measure. |
| Dianat, I., Feizi, H., & Hasan-Khali, K. (2015) | 511 (105) | Subset - ages ranging from 7-30 years old. The two useable groups for this study are 21-25 (n=58) and 26-30 (n=47) | Participants recruited from schools and government buildings in northwest Iran | Mixed, dominance is indicated in Table 1 for entire study but no data available for the utilized age subsets | Four maximal isometric pinch exertions were conducted using a B&L pinch gauge: 1) peak lateral pinch strength, 2) key pinch strength, 3) tip-to-tip pinch strength and, 4) three-jaw pinch strength. | Data can be found in Tables 2 (lateral pinch), 3(key pinch), 4 (tip-to-tip pinch), and 5(three-jaw pinch) with all means and ranges displayed in kilograms. Data can be pooled across the two usable subgroups of 21-25 and 26-30 or viewed individually. Data reported in all tables is the mean value of two maximal trials that were within 10% of one another. | Additional sub-comparison can be made between the sexes or pooled in the 'All' columns. | Pinch strength exertions with the dominant hand were significantly higher than those exerted by the non-dominant hand for all types of measurements. |
| Dottor, A., Sansone, L. G., Battista, S., Mori, L., & Testa, M. (2021) | 303 (183) | Subset - also included adults beyond working age. Thus, the three useable groups for this study were 18-29 (n=60), 30-44 (n=63) and 45-59 (n=60) | A convenience sample of community participants over 18 years of age and who were not ambidextrous or mixed-handed | Mixed, 162 right handed and 22 left handed | A custom strain gauge was used to quantify participants' palmar pinch, tip pinch and tip of finger extension maximal contractions. | Data reported in Table 2 (kg) is the maximum of two consecutive maximal trials. The dominant and non dominant efforts are separated and the three useable age groups listed. | Breakdown by age group in Table 2 allows for further sub-analysis. Additionally, group means are also broken down by age and sex in figures 4 (Palmar pinch), 5 (tip pinch), and 6 (extension). | Results were mixed with a significant difference between the hands only in some age groups and sometimes only one sex for the palmar and tip pinches. No significant differences were found between the hands for the extension task. |
| Li, S., Danion, F., Latash, M. L., Li, Z. M., & Zatsiorsky, V. M. (2000) | 10 | Whole | 10 healthy volunteers aged 22 to 34 (8 males, 2 female) | Mixed, five males right-handed, two females and three males left-handed. | With their forearms resting on a table, participants had their hands positioned palm down so each finger rested on a piezoelectric sensor. Downward finger pressure was quantified during single finger exertions. | A comparison between the dominant and non-dominant hand for each finger force task is displayed in Table 1. Individual finger forces (N) for every finger are displayed during the maximal output for one finger. Bolded numbers on the matrix indicate that finger's maximal force (first 4 rows). Several practice trials were attempted, but the data displayed is the group mean of a participant's single maximal exertion. | No sub comparisons available. | The non-dominant hand was 1.9% weaker than the dominant though there were no significant differences between the limbs across strength tasks. |
| Li, X., He, W., Li, C., Wang, Y. C., Slavens, B. A., & Zhou, P. (2015) | 26 | Whole | 26 healthy participants (nine female and 17 male), 19 to 58 years old | Mixed, 24 right-handed and 2 left  handed | While seated in an upright posture with their shoulder adducted and neutrally rotated, their elbow flexed between 80° to 100°, and their forearm in the neutral position, participants exerted maximal handgrip and keygrips against a Jamar dynamometer and a B&L Engineering pinch gauge respectively. | Figure 1 (top left) is a graphical presentation of strength data in the grip task and pinch task between dominant and non-dominant hands for all participants while individual data for left-handed participants is presented in Table 1. The data included is the highest value of participants' three maximal strength trials. | No sub comparisons available other than the left-hander data separated out. | For both grip strength and pinch strength the dominant side was significantly stronger. |
| MacDonald, V., Wilson, K., Sonne, M. W. L., & Keir, P. J. (2017) | 20 | Whole | 20 healthy female workers aged 22-56 | Not indicated | Four common syringe pinch grip types were tested for maximal strength against a custom instrumented syringe transducer: (a) chuck pinch, (b) chuck pinch variation, (c) thenar pinch, (d) two-handed pinch using both dominant and non-dominant hands, however only the single handed exertions are applicable to investigate the effect of hand use. | Table 2 displays dominant vs non-dominant strengths summed across all pinch types (N) while figure 2 graphically displays the effect of hand use in each individual task (N). The data provided is the group mean peak force of at least two maximal trials for each condition. | Narrow and wide hand postures were conducted on all tasks and that breakdown is available on Figure 2. | Dominant hand exertions were significantly stronger for all 3 single handed pinch tasks in both the narrow and wide condition. |
| Rajendran, N. (2010) | 60 | Whole | 60 healthy college kinesiology students (30 male, 30 female) | Not indicated | Embedded in a larger battery of tests, handgrip and pinch strength were assessed using the Lafayette Hand Dynamometer and the Vernier Digital Hand Dynamometer respectively. | Data for handgrip strength and pinch grip strength between the dominant and non-dominant hand is displayed in Table 4 (kg). 3-4 trials were recorded for each participant and each condition however it is unclear if peak or average of those trials is represented in the group means. | Further breakdown of both handgrip and pinch grip strength by sex is provided in Table 4. | The study statistics indicate a significantly greater strength of the dominant hand only in female participants, however, the analyzed strength data were normalized to body weight and not raw values so not directly applicable to other results. |
| Tanaka, M., McDonagh, M. J., & Davies, C. T. (1984) | 10 | Whole | 10 healthy adults aged between 20 and 46 years old | Not indicated | The abduction force of the index finger by the first dorsal interosseus muscle was examined with the palm face down in an apparatus that isolated the index finger (Figure 1). The thumb was extended with a plastic block as a custom transducer measured index finger abduction force. | Data for maximal contraction (MVC, N) can be found in Table 1. | No sub comparison. | There was no significant difference in maximal finger abduction strength between the dominant and non dominant hand. |
| Zijdewind, I., & Kernell, D. (2001) | 5 | Whole | Five healthy subjects (three females, two males) | Mixed, one male and one female left-handed, one male and two female right-handed | The index finger was slightly abducted and the first dorsal interosseus (FDI) maximally contracted against a custom transducer placed at the proximal interphalangeal joint. | All subjects' individual data as well as spooled data are available in Table 1. maximal strength of the dominant vs non-dominant FDI is presented (N) data are the peak value obtained from six maximal contractions, three of which were also electrically stimulated during exertion. | Individual participant data are presented in addition to means. | Results for dominant vs non-dominant strength are presented (mean MVC force was 42.1 ± 6.8 N (SD) for the dominant hand and 41.2 ± 7.2 N for the nondominant hand) but no remark as to statistical significance is mentioned. |

**Table 3B: Multi-joint/functional strength in right vs left hands**

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| Paper | Total n (n of subset) | Whole study or control group/subset | Description of population | Participants' handedness | Description of exertion(s) | Data reported and location in manuscript | Additional sub-comparisons available | Key Info Summary |
| Cetinus, E., Buyukbese, M. A., Uzel, M., Ekerbicer, H., & Karaoguz, A. (2005) | 123 (47) | Subset - healthy non-diabetic controls | 47 non-diabetic control subjects comprised of homemakers, civil servants and retirees. 19 males and 28 females aged 46.93 ± 10.2 | 38 right-handed, 6 left-handed and 3 ambidextrous | with the shoulder adducted and neutrally rotated, the elbow flexed at 90°, and the forearm and wrist neutrally positioned, participants performed a key pinch on a B&L Engineering PG-30 pinch gauge. Methods were performed in accordance with American  Society of Hand Therapists’ recommendations for testing both grip and pinch strengths and three exertions were performed with 15s intervals. | Grouped data are reported in Table 3, separated into right and left-hand means of the three maximal exertions, while dom/non-dom group means are available in Table 7. | additional R/L sub-comparisons of age group (table 4: 30-49 and >50) and sex (table 5) are available. | Strength for both the pinch grip and handgrip were significantly higher in the dominant hand. |
| Imrhan, S. N., & Jenkins, G. D. (1999) | 20 | Whole | Healthy males (n=10) and females (n=10) between the ages of 25 and 40 years old. All males were seasoned manual workers while females were a mix of one manual worker and nin non-manual workers | Not provided | Participants performed maximal hand turning torques against a manually held portable Snap-On Tools torque meter outfitted with custom handles. Torque exertions took place under a variety of conditions including: handle finish (smooth/knurled), action (flexion/extension), arm position (shoulder flexion of 30°, 90°, and 130°). | Peak wrist twisting torques (N.m) are reported in Table 2 as group means and the largest of two maximal exertion attempts. | Results between right and left hands are further subdivided by sex, action, shoulder angle and handle surface. | Measured wrist twisting torques on 2 14" cylinder handles during a variety of scenarios and compared abilities of the right vs left hand with further comparisons of sex and other conditions. The right hand was significantly stronger across all conditions (Table 3). |
| Lo, V. E., Chiu, Y. C., Tu, H. H., Liu, C. W., & Yu, C. Y. (2019) | 198 | Whole | Participants were male (n=99) and female (n=99) operators and/or engineers working on a production line for at least 6 months in the manufacturing industry in Central Taiwan. | Mixed (breakdown in Table 1) | Participants performed a series of hand and arm exertions designed to replicate industrial requirements. Hand exertions of grip strength, lateral pinch, palmar pinch, thumb press and ball of thumb test were exerted against either a (DA 100C, BIOPAC System transducer or a modified Kyowa Electronic Instruments LTZ-50KA load cell with the shoulder at 0° flexion and 0° abduction and the elbow at 90° flexion. | Data are reported (Table 2) is the mean force (kgw) exerted for the task during the middle 3s of a 5s maximal contraction and a mean of 3 trials. | Data are displayed as means for each hand (right/left) but also broken down by task and age group in tables 4 (males) and 5 (females). | Aimed to provide strength data on a seriend of industrial style exertions in a central Taiwanese population, this study found the strength  of grip, lateral pinch, and palm pinch was significantly greater in the right hand when results were collapsed across sex. The strength of the ball of the thumb push task was stronger in the left hand for males but showed no difference for females. |
| Mathiowetz, V., Kashman, N., Volland, G., Weber, K., Dowe, M., & Rogers, S. (1985) | 628 (467) | Subset - not interested in three age groups with participants 65+ years old | Volunteers(n=628 total) from across a variety of socioeconomic and occupational groups in the Milwaukee ,WI region as long as they were without pain or injury. | Mixed (breakdown for each age group and between sexes in Table 1) | Participants were tested for maximal grip strength (Jamar Dynamometer - second handle for all participants) as well as tip pinch, key pinch, and palmar pinch with a B&L pinch gauge. For all tests the shoulder was at the side while the elbow was flexed at 90°, wrists were ulnar deviated between 0° and 30° and dorsiflexed between 0° and 30°. | Data are reported in table format such that mean force (lbs) is reported between right and left hands for Grip strength (Table 2), Tip Pinch (Table 3), Key pinch (Table 4) and palmar pinch (Table 5). The text mentions that three tests were conducted for each participant and condition; however it does not specify if the peak or average was used to calculate the mean. | Data are further broken down by sex and age group within each table (Tables 2, 3, 4, & 5). | The right hand is significantly stronger across both sexes with a few exceptions.when a sub-analysis was performed between right-handers and left-handers they demonstrated the same right/left pattern of strength, however this data are notably 7% of the total sample size and includes ages over 65 so should not be relied on for our analysis. |

**Table 3C: Multi-joint/functional strength in studies with combined dominant/non-dominant and right/left reporting**

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| Paper | Total n (n of subset) | Whole study or control group/subset | Description of population | Participants' handedness | Description of exertion(s) | Data reported and location in manuscript | Additional sub-comparisons available | Key Info Summary |
| Adam, A., De Luca, C. J., & Erim, Z. (1998) | 8 | Whole | Eight healthy males aged 21–39 | Three right-handed, four left-handed and one non-preferential subjects according to the Edinburgh Handedness Inventory. | The FDI was fixed at maximum length by a setup orienting the thumb at a 90° angle to the index finger. A transducer was placed against the proximal interphalangeal joint of the index finger for participants to perform maximal exertions of both hands. | Data are reported in Table 1, displaying dominant and non-dominant FDI MVCs in Newtons. | No sub comparison but data are available individually for each participant. | Dominant hand was not significantly stronger than the non-dominant hand. |
| Yielder, P., Gutnik, B., Kobrin, V., & Hudson, G. (2009) | 25 | Whole participant pool from ‘study 1’ | A convenience sample of 31 community males aged, then the 25 participants highest scoring for right-handedness were selected | All right handed | The force of the FDI was measured via a custom dynamometer with the index finger and thumb placed at 90°. Maximal force was measured 20 times and averaged. | Maximal force (mean value of 20 trials) is displayed in Table 2 (N). Individualized data are displayed for left(non-dominant) and right (dominant) hands. | No further breakdown. | Participants' right (dominant) FDI produced significantly more force than their left. |

**Table 4A: Manual arm strength/end effector strength in dominant vs non-dominant hands**

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| Paper | Total n (n of subset) | Whole study or control group/subset | Description of population | Participants' handedness | Description of exertion(s) | Data reported and location in manuscript | Additional sub-comparisons available | Key Info Summary |
| Axelsson, P., Fredrikson, P., Nilsson, A., Andersson, J. K., & Karrholm, J. (2018) | 499 (330) | Subset - only the 26-35, 36-45, 46-55 and 56-65 age groups can be used for this investigation | Approximately 261 (age ranges broken down graphically in Figure 1) Swedish volunteers free of musculoskeletal injury | Mixed, outlined in Appendix A | Upwards manual arm strength (lifting strength as described in the paper) was measured using a hanging dynamometer scale from Kern & Sohn while standing with the shoulder slightly abducted and 90° of elbow flexion (Figure 3). | Maximal manual lifting strength data are available graphically in Appendix C. | Sub-comparisons can be made by sex, forearm orientation or age range. | Because many age ranges are excluded for the purposes of this analysis, Results based on group means reported in the study do not apply. Data needs to be evaluated in more detail. |

**Table 4B: Manual arm strength/end effector strength in right vs left hands**

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| Paper | Total n (n of subset) | Whole study or control group/subset | Description of population | Participants' handedness | Description of exertion(s) | Data reported and location in manuscript | Additional sub-comparisons available | Key Info Summary |
| Riemann, B. L., Davis, S. E., Huet, K., & Davies, G. J. (2016) | 24 | Whole | Physically active college men (n=12) and women (n=12) between the ages of 18 and 30. | Not indicated | An isokinetic pushing and pulling task performed using the closed kinetic chain attachment of a Bio-dex® System 3 Isokinetic Dynamometer where the hand exerted against a handle from a position of 0° shoulder flexion and 90° elbow flexion to 90° shoulder flexion and 0° elbow flexion. Work was performed at 3 speeds of 120°/s, 210°/s, and 300°/s. | Mean forces(N) of the five repetitions are displayed for each of two separate sessions. Results are broken down according to limb (dominant and non-dominant) and speed for pushing(table 1) and pulling (table 2) phases. | Speed of movement, session (identical protocol). | The results between sessions demonstrate high reliability of the measurements and showed no significant difference between dominant or non-dominant limb peak force in either the push or pull tasks. |

**Table 4C: Manual arm strength/end effector strength in studies with combined dominant/non-dominant and right/left reporting**

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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Paper | Total n (n of subset) | Whole study or control group/subset | Description of population | Participants' handedness | Description of exertion(s) | Data reported and location in manuscript | Additional sub-comparisons available | Key Info Summary |
| Johnson, H. E. (2003) | 20 | Whole | A university student population sample of males (n=10) and females (n=10) between 19 to 38. | Mixed, right handed (n=12) and left handed (n = 8) | Exertions consisted of index push , thumb push, and lateral pinch push exertions across four postures (overhead, elbows abducted, waist bent, and seated) against a three-axis load cell (AMTI model MSA-6-500). | Group mean maximal contraction forces (MVEs) are available in table 16 (page 46) and table 17 (page 47). data are presented in Newtons and broken down by task (1-10) and sex. | Posture (upright overhead reach, upright elbows abducted, waist bend forward reach, seated forward reach), and coupling (index push, thumb push, lateral pinch). Sex differences are available for right/left hands but dominant/ non-dominant reporting is collapsed across sex. | Across all tasks the dominant hand produced MVEs significantly higher (6%) than the non-dominant hand. |
| Shamsul, B. M. T., & Tan, C. Y. (2012) | 96 | Whole | Male(n=48) and female(n=48) university undergraduate students between 18-25 years old | All right handed | Examined static manual lifting strength of unimanual and bimanual exertions during four lifting postures (back lifting, upper body lifting, arm lifting (elbow), and shoulder lifting (overhead)) and across three foot positions (force vector between the feet, force vector inline with the toes, force vector anterior to the toes). All exertions were isometric MVCs against a handle attached to a chain attached to a Takei A5102 dynamometer. | Values are the peak of 3 trials. Group means of forces (kgs) are displayed in table 2. log transformed data collapsed across males and females available in Table 3. | Male/female, lifting posture, horizontal distance of force application. | Across many conditions of unimanual manual lifting tasks, differences in strength between the hands varied up to 9.4% and were observed to be greater in both right (dominant) and left (non-dominant) directions. |
| Wakeely, F. (2021) | 26 | Whole | Participants form a university student sample of males (n=13) and females (n=13) between the ages of 18 and 30 | Mixed, right handed (n=13) and left handed (n = 13) | Participants grasped a handle affixed to a 6-axis load cell (Bertec PY6-500) and exerted in 6 directions (push (anterior), pull (posterior), up (superior), down (inferior), right and  left (medial or lateral, depending on hand of exertion)) at 3 locations (Umbilicus, Shoulder, and Overhead). | Figure 2 displays strength differences between the limbs (dominant/non-dominant) across 3 locations and separated by handedness. These results collapsed across location, direction and sex, strength differences between right-handed and left-handed based on dominance are available in Figure 3 and Figure 4 depicts the difference in strength between the limbs for each exertion direction. Group mean maximal forces (N) are available in Appendix D separated by location, direction and handedness (dominant/non-dominant). Raw group mean MAS values by condition are available in Appendix D. | Hand location (overhead, shoulder height, umbilical height), handedness (left handed or right handed), exertion direction (up, down, push, pull, medial, lateral). Sex differences in total strength are available but not differentiated by hands or dominance. | Across most tasks the dominant hand was marginally stronger, and was significantly stronger in the right handed participants. Other significantly different instances where the dominant arm was stronger included left handers at umbilical height, right handers at shoulder height, pushes, and pulls. |