

References

- Aggarwal, J. K. and Cai, Q. (1999), "Human motion analysis: A review", *Computer vision and image understanding*, Vol. 73, No. 3, pp. 428–440 1999
- Allin, S. and Mihailidis, A. (2009), "Low-cost, automated assessment of sit-to-stand movement in "natural" environments", in *4th European Conference of the International Federation for Medical and Biological Engineering*, pp. 76–79, Springer 2009
- Anbalagan, V. P., Venkataraman, V., Pradeepa, R., Deepa, M., Anjana, R. M., and Mohan, V. (2013), "The prevalence of presarcopenia in Asian Indian individuals with and without type 2 diabetes", *Diabetes technology & therapeutics*, Vol. 15, No. 9, pp. 768–775 2013
- Arcelus, A., Veledar, I., Goubran, R., Knoefel, F., Sveistrup, H., and Bilodeau, M. (2011), "Measurements of sit-to-stand timing and symmetry from bed pressure sensors", *IEEE Transactions on instrumentation and measurement*, Vol. 60, No. 5, pp. 1732–1740 2011
- Batzopoulou, V. and Brodie, D. (1989), "Isokinetic dynamometry", *Sports medicine*, Vol. 8, No. 2, pp. 101–116 1989
- Banerjee, T., Skubic, M., Keller, J. M., and Abbott, C. (2013), "Sit-to-stand measurement for in-home monitoring using voxel analysis", *IEEE journal of biomedical and health informatics*, Vol. 18, No. 4, pp. 1502–1509 2013
- Batista, F. S., Gomes, G. A. d. O., D'Elboux, M. J., Cintra, F. A., Neri, A. L., Guariento, M. E., and Souza, M. d. L. R. d. (2014), "Relationship between lower-limb muscle strength and functional independence among elderly people according to frailty criteria: a cross-sectional study", *Sao Paulo Medical Journal*, Vol. 132, No. 5, pp. 282–289 2014
- Bean, J. F., Kiely, D. K., LaRose, S., Alian, J., and Frontera, W. R. (2007), "Is stair climb power a clinically relevant measure of leg power impairments in at-risk older adults?", *Archives of physical medicine and rehabilitation*, Vol. 88, No. 5, pp. 604–609 2007
- Beaudart, C., Reginster, J.-Y., Slomian, J., Buckinx, F., Locquet, M., and Bruyère, O. (2014), "Prevalence of sarcopenia: the impact of different diagnostic cut-off limits", *J Musculoskelet Neuronal Interact*, Vol. 14, No. 4, pp. 425–31 2014
- Bland, J. M. and Altman, D. G. (1999), "Measuring agreement in method comparison studies", *Statistical methods in medical research*, Vol. 8, No. 2, pp. 135–160 1999
- Buckinx, F., Landi, F., Cesari, M., Fielding, R. A., Visser, M., Engelke, K., Maggi, S., Dennison, E., Al-Daghri, N. M., Allepaerts, S. et al. (2018), "Pitfalls in the measurement of muscle mass: a need for a reference standard", *Journal of cachexia, sarcopenia and muscle*, Vol. 9, No. 2, pp. 269–278 2018
- Chen, K., Gabriel, P., Alasfour, A., Gong, C., Doyle, W. K., Devinsky, O., Friedman, D., Dugan, P., Melloni, L., Thesen, T. et al. (2018), "Patient-specific pose estimation in clinical environments", *IEEE Journal of Translational Engineering in Health and Medicine*, Vol. 6, pp. 1–11 2018
- Chen, L.-K., Liu, L.-K., Woo, J., Assantachai, P., Auyueung, T.-W., Bahyah, K. S., Chou, M.-Y., Chen, L.-Y., Hsu, P.-S., Krairit, O. et al. (2014), "Sarcopenia in Asia: consensus report of the Asian Working Group for Sarcopenia", *Journal of the American Medical Directors Association*, Vol. 15, No. 2, pp. 95–101 2014
- Cho, J. (2019), "Current Status and Prospects of Health-Related Sensing Technology in Wearable Devices", *Journal of Healthcare Engineering*, Vol. 2019 2019
- Cohen, J., *Statistical power analysis for the behavioral sciences*, Routledge 2013
- Cooper, C., Dere, W., Evans, W., Kanis, J. A., Rizzoli, R., Sayer, A. A., Sieber, C., Kaufman, J.-M., Van Kan, G. A., Boonen, S. et al. (2012), "Frailty and sarcopenia: definitions and outcome parameters", *Osteoporosis International*, Vol. 23, No. 7, pp. 1839–1848 2012
- Cooper, C., Fielding, R., Visser, M., Van Loon, L., Rolland, Y., Orwoll, E., Reid, K., Boonen, S., Dere, W.,

- Epstein, S. et al. (2013), "Tools in the assessment of sarcopenia", *Calcified tissue international*, Vol. 93, No. 3, pp. 201–210 2013
- Cooper, R., Kuh, D., Hardy, R. et al. (2010), "Objectively measured physical capability levels and mortality: systematic review and meta-analysis", *Bmj*, Vol. 341, p. c4467 2010
- Cruz-Jentoft, A. J., Baeyens, J. P., Bauer, J. M., Boirie, Y., Cederholm, T., Landi, F., Martin, F. C., Michel, J.-P., Rolland, Y., Schneider, S. M. et al. (2010), "Sarcopenia: European consensus on definition and diagnosisReport of the European Working Group on Sarcopenia in Older PeopleA. J. Cruz-Gentoft et al.", *Age and ageing*, Vol. 39, No. 4, pp. 412–423 2010
- Cruz-Jentoft, A. J., Bahat, G., Bauer, J., Boirie, Y., Bruyère, O., Cederholm, T., Cooper, C., Landi, F., Rolland, Y., Sayer, A. A. et al. (2018), "Sarcopenia: revised European consensus on definition and diagnosis", *Age and ageing*, Vol. 48, No. 1, pp. 16–31 2018
- Csuka, M. and McCarty, D. J. (1985), "Simple method for measurement of lower extremity muscle strength", *The American journal of medicine*, Vol. 78, No. 1, pp. 77–81 1985
- DESA, U. (2015), "United nations department of economic and social affairs, population division. world population prospects: The 2015 revision, key findings and advance tables", in Technical ReportWorking Paper No. ESA/P/WP. 241 2015
- Doheny, E. P., Fan, C. W., Foran, T., Greene, B. R., Cunningham, C., and Kenny, R. A. (2011), "An instrumented sit-to-stand test used to examine differences between older fallers and non-fallers", in *2011 Annual International Conference of the IEEE Engineering in Medicine and Biology Society*, pp. 3063–3066, IEEE 2011
- Doheny, E. P., Walsh, C., Foran, T., Greene, B. R., Fan, C. W., Cunningham, C., and Kenny, R. A. (2013), "Falls classification using tri-axial accelerometers during the five-times-sit-to-stand test", *Gait & posture*, Vol. 38, No. 4, pp. 1021–1025 2013
- Ejupi, A., Brodie, M., Gschwind, Y. J., Lord, S. R., Zagler, W. L., and Delbaere, K. (2016), "Kinect-based five-times-sit-to-stand test for clinical and in-home assessment of fall risk in older people", *Gerontology*, Vol. 62, No. 1, pp. 118–124 2016
- Fried, L. P., Tangen, C. M., Walston, J., Newman, A. B., Hirsch, C., Gottdiener, J., Seeman, T., Tracy, R., Kop, W. J., Burke, G. et al. (2001), "Frailty in older adults: evidence for a phenotype", *The Journals of Gerontology Series A: Biological Sciences and Medical Sciences*, Vol. 56, No. 3, pp. M146–M157 2001
- Glenn, J. M., Gray, M., and Binns, A. (2017), "Relationship of sit-to-stand lower-body power with functional fitness measures among older adults with and without sarcopenia", *Journal of Geriatric Physical Therapy*, Vol. 40, No. 1, pp. 42–50 2017
- Gray, M., Glenn, J. M., and Binns, A. (2016), "Predicting sarcopenia from functional measures among community-dwelling older adults", *Age*, Vol. 38, No. 1, p. 22 2016
- Greene, B. R., Doheny, E. P., Kenny, R. A., and Caulfield, B. (2014), "Classification of frailty and falls history using a combination of sensor-based mobility assessments", *Physiological measurement*, Vol. 35, No. 10, p. 2053 2014
- Gunasekaran, V., Banerjee, J., Dwivedi, S. N., Upadhyay, A. D., Chatterjee, P., and Dey, A. B. (2016), "Normal gait speed, grip strength and thirty seconds chair stand test among older Indians", *Archives of gerontology and geriatrics*, Vol. 67, pp. 171–178 2016
- Guralnik, J. M., Simonsick, E. M., Ferrucci, L., Glynn, R. J., Berkman, L. F., Blazer, D. G., Scherr, P. A., and Wallace, R. B. (1994), "A short physical performance battery assessing lower extremity function: association with self-reported disability and prediction of mortality and nursing home admission", *Journal of gerontology*, Vol. 49, No. 2, pp. M85–M94 1994
- He, W., Goodkind, D., Kowal, P. R. et al. (2016), "An aging world: 2015", 2016
- Hopkins, W., Marshall, S., Batterham, A., and Hanin, J. (2009), "Progressive statistics for studies in sports medicine and exercise science", *Medicine+ Science in Sports+ Exercise*, Vol. 41, No. 1, p. 3 2009
- Houck, J., Kneiss, J., Bukata, S. V., and Puzas, J. E. (2011), "Analysis of vertical ground reaction force variables during a Sit to Stand task in participants recovering from a hip fracture", *Clinical Biomechanics*, Vol. 26, No. 5, pp. 470–476 2011
- Jain, H. and Harit, G. (2016), "A framework to assess sun salutation videos", in *Proceedings of the Tenth*

- Indian Conference on Computer Vision, Graphics and Image Processing*, p. 29, ACM 2016
- Jain, H. and Harit, G. (2017), “Detecting missed and anomalous action segments using approximate string matching algorithm”, in *National Conference on Computer Vision, Pattern Recognition, Image Processing, and Graphics*, pp. 101–111, Springer 2017
- Kang, D. W., Choi, J. S., Lee, J. W., Chung, S. C., Park, S. J., and Tack, G. R. (2010), “Real-time elderly activity monitoring system based on a tri-axial accelerometer”, *Disability and Rehabilitation: Assistive Technology*, Vol. 5, No. 4, pp. 247–253 2010
- Kannus, P. (1994), “Isokinetic evaluation of muscular performance”, *International journal of sports medicine*, Vol. 15, No. 5, pp. S11–S18 1994
- Kato, Y., Islam, M. M., Young, K. C., Rogers, M. E., and Takeshima, N. (2015), “Threshold of chair stand power necessary to perform activities of daily living independently in community-dwelling older women”, *Journal of Geriatric Physical Therapy*, Vol. 38, No. 3, pp. 122–126 2015
- Kyle, U., Genton, L., Hans, D., and Pichard, C. (2003), “Validation of a bioelectrical impedance analysis equation to predict appendicular skeletal muscle mass (ASMM)”, *Clinical nutrition*, Vol. 22, No. 6, pp. 537–543 2003
- Lee, R. C., Wang, Z., Heo, M., Ross, R., Janssen, I., and Heymsfield, S. B. (2000), “Total-body skeletal muscle mass: development and cross-validation of anthropometric prediction models”, *The American journal of clinical nutrition*, Vol. 72, No. 3, pp. 796–803 2000
- Liberati, A., Altman, D. G., Tetzlaff, J., Mulrow, C., Gøtzsche, P. C., Ioannidis, J. P., Clarke, M., Devereaux, P. J., Kleijnen, J., and Moher, D. (2009), “The PRISMA statement for reporting systematic reviews and meta-analyses of studies that evaluate health care interventions: explanation and elaboration”, *PLoS medicine*, Vol. 6, No. 7, p. e1000100 2009
- Lindemann, U., Claus, H., Stuber, M., Augat, P., Muche, R., Nikolaus, T., and Becker, C. (2003), “Measuring power during the sit-to-stand transfer”, *European journal of applied physiology*, Vol. 89, No. 5, pp. 466–470 2003
- Lindemann, U., Muche, R., Stuber, M., Zijlstra, W., Hauer, K., and Becker, C. (2007), “Coordination of strength exertion during the chair-rise movement in very old people”, *The Journals of Gerontology Series A: Biological Sciences and Medical Sciences*, Vol. 62, No. 6, pp. 636–640 2007
- Locquet, M., Beaudart, C., Reginster, J.-Y., Petermans, J., and Bruyère, O. (2018), “Comparison of the performance of five screening methods for sarcopenia”, *Clinical epidemiology*, Vol. 10, p. 71 2018
- Loney, P. L., Chambers, L. W., Bennett, K. J., Roberts, J. G., and Stratford, P. W. (1998), “Critical appraisal of the health research literature: prevalence or incidence of a health problem”, *Chronic Dis Can*, Vol. 19, No. 4, pp. 170–6 1998
- Malmstrom, T. K. and Morley, J. E. (2013), “SARC-F: a simple questionnaire to rapidly diagnose sarcopenia”, *Journal of the American Medical Directors Association*, Vol. 14, No. 8, pp. 531–532 2013
- Matsuyama, H., Hiroi, K., Kaji, K., Yonezawa, T., and Kawaguchi, N. (2019), “Hybrid Activity Recognition for Ballroom Dance Exercise using Video and Wearable Sensor”, in *2019 Joint 8th International Conference on Informatics, Electronics & Vision (ICIEV) and 2019 3rd International Conference on Imaging, Vision & Pattern Recognition (icIVPR)*, pp. 112–117, IEEE 2019
- Millington, P. J., Myklebust, B. M., and Shambes, G. M. (1992), “Biomechanical analysis of the sit-to-stand motion in elderly persons”, *Archives of Physical Medicine and Rehabilitation*, Vol. 73, No. 7, pp. 609–617 1992
- Millor, N., Lecumberri, P., Gómez, M., Martínez-Ramírez, A., and Izquierdo, M. (2013), “An evaluation of the 30-s chair stand test in older adults: frailty detection based on kinematic parameters from a single inertial unit”, *Journal of neuroengineering and rehabilitation*, Vol. 10, No. 1, p. 86 2013
- Millor, N., Lecumberri, P., Gómez, M., Martínez-Ramírez, A., and Izquierdo, M. (2014a), “Frailty Detection Using the Instrumented Version of the 30-s Chair Stand Test”, in *Replace, Repair, Restore, Relieve—Bridging Clinical and Engineering Solutions in Neurorehabilitation* pp. 553–561, Springer 2014a
- Millor, N., Lecumberri, P., Gomez, M., Martinez-Ramirez, A., and Izquierdo, M. (2014b), “Kinematic parameters to evaluate functional performance of sit-to-stand and stand-to-sit transitions using motion sensor devices: a systematic review”, *IEEE transactions on neural systems and rehabilitation*

- engineering, Vol. 22, No. 5, pp. 926–936 2014b
- Millor, N., Lecumberri, P., Gómez, M., Martinez, A., Martinikorena, J., Rodriguez-Manas, L., Garcia-Garcia, F., and Izquierdo, M. (2017), “Gait velocity and chair sit-stand-sit performance improves current frailty-status identification”, *IEEE Transactions on Neural Systems and Rehabilitation Engineering*, Vol. 25, No. 11, pp. 2018–2025 2017
- Morley, J. E., Abbatemola, A. M., Argiles, J. M., Baracos, V., Bauer, J., Bhasin, S., Cederholm, T., Coats, A. J. S., Cummings, S. R., Evans, W. J. et al. (2011), “Sarcopenia with limited mobility: an international consensus”, *Journal of the American Medical Directors Association*, Vol. 12, No. 6, pp. 403–409 2011
- Neder, J. A., Andreoni, S., Lerario, M. C., and Nery, L. E. (1999), “Reference values for lung function tests: II. Maximal respiratory pressures and voluntary ventilation”, *Brazilian journal of medical and biological research*, Vol. 32, No. 6, pp. 719–727 1999
- Newell, A., Yang, K., and Deng, J. (2016), “Stacked hourglass networks for human pose estimation”, in *European conference on computer vision*, pp. 483–499, Springer 2016
- Nishimura, T., Arima, K., Okabe, T., Mizukami, S., Tomita, Y., Kanagae, M., Goto, H., Horiguchi, I., Abe, Y., and Aoyagi, K. (2017), “Usefulness of chair stand time as a surrogate of gait speed in diagnosing sarcopenia”, *Geriatrics & gerontology international*, Vol. 17, No. 4, pp. 659–661 2017
- Patel, H. P., Syddall, H. E., Jameson, K., Robinson, S., Denison, H., Roberts, H. C., Edwards, M., Dennison, E., Cooper, C., and Aihie Sayer, A. (2013), “Prevalence of sarcopenia in community-dwelling older people in the UK using the European Working Group on Sarcopenia in Older People (EWGSOP) definition: findings from the Hertfordshire Cohort Study (HCS)”, *Age and ageing*, Vol. 42, No. 3, pp. 378–384 2013
- Payette, M.-C., Belanger, C., Léveillé, V., and Grenier, S. (2016), “Fall-related psychological concerns and anxiety among community-dwelling older adults: Systematic review and meta-analysis”, *PLoS one*, Vol. 11, No. 4, p. e0152848 2016
- Pehlivan, S. and Duygulu, P. (2011), “A new pose-based representation for recognizing actions from multiple cameras”, *Computer Vision and Image Understanding*, Vol. 115, No. 2, pp. 140–151 2011
- Pinheiro, P. A., Carneiro, J., Coqueiro, R., Pereira, R., and Fernandes, M. (2016), “Chair stand test as simple tool for sarcopenia screening in elderly women”, *The journal of nutrition, health & aging*, Vol. 20, No. 1, pp. 56–59 2016
- Pirsiavash, H., Vondrick, C., and Torralba, A. (2014), “Assessing the quality of actions”, in *European Conference on Computer Vision*, pp. 556–571, Springer 2014
- Regterschot, G. R. H., Zhang, W., Baldus, H., Stevens, M., and Zijlstra, W. (2015), “Sensor-based monitoring of sit-to-stand performance is indicative of objective and self-reported aspects of functional status in older adults”, *Gait & posture*, Vol. 41, No. 4, pp. 935–940 2015
- Reiss, J., Iglseder, B., Kreutzer, M., Weilbuchner, I., Treschnitzer, W., Kässmann, H., Pirich, C., and Reiter, R. (2016), “Case finding for sarcopenia in geriatric inpatients: performance of bioimpedance analysis in comparison to dual X-ray absorptiometry”, *BMC geriatrics*, Vol. 16, No. 1, p. 52 2016
- Rockwood, K., Song, X., MacKnight, C., Bergman, H., Hogan, D. B., McDowell, I., and Mitnitski, A. (2005), “A global clinical measure of fitness and frailty in elderly people”, *Cmaj*, Vol. 173, No. 5, pp. 489–495 2005
- Rosenberg, I. H. (1997), “Sarcopenia: origins and clinical relevance”, *The Journal of nutrition*, Vol. 127, No. 5, pp. 990S–991S 1997
- Sabharwal, S. and Kumar, A. (2008), “Methods for assessing leg length discrepancy”, *Clinical orthopaedics and related research*, Vol. 466, No. 12, pp. 2910–2922 2008
- Saito, A., Ema, R., Inami, T., Maeo, S., Otsuka, S., Higuchi, M., Shibata, S., and Kawakami, Y. (2017), “Anatomical cross-sectional area of the quadriceps femoris and sit-to-stand test score in middle-aged and elderly population: development of a predictive equation”, *Journal of physiological anthropology*, Vol. 36, No. 1, p. 3 2017
- Sanderson, S., Tatt, I. D., and Higgins, J. (2007), “Tools for assessing quality and susceptibility to bias in observational studies in epidemiology: a systematic review and annotated bibliography”, *International journal of epidemiology*, Vol. 36, No. 3, pp. 666–676 2007

- Schurr, K., Sherrington, C., Wallbank, G., Pamphlett, P., and Olivetti, L. (2012), "The minimum sit-to-stand height test: reliability, responsiveness and relationship to leg muscle strength", *Clinical rehabilitation*, Vol. 26, No. 7, pp. 656–663 2012
- Sergi, G., De Rui, M., Veronese, N., Bolzetta, F., Berton, L., Carraro, S., Bano, G., Coin, A., Manzato, E., and Perissinotto, E. (2015), "Assessing appendicular skeletal muscle mass with bioelectrical impedance analysis in free-living Caucasian older adults", *Clinical nutrition*, Vol. 34, No. 4, pp. 667–673 2015
- Slaughter, S. E., Wagg, A. S., Jones, C. A., Schopflocher, D., Ickert, C., Bampton, E., Jantz, A., Milke, D., Schalm, C., Lycar, C. et al. (2015), "Mobility of vulnerable elders study: effect of the sit-to-stand activity on mobility, function, and quality of life", *Journal of the American Medical Directors Association*, Vol. 16, No. 2, pp. 138–143 2015
- Smith, E., Walsh, L., Doyle, J., Greene, B., and Blake, C. (2016), "The reliability of the quantitative timed up and go test (QTUG) measured over five consecutive days under single and dual-task conditions in community dwelling older adults", *Gait & posture*, Vol. 43, pp. 239–244 2016
- Smith, W. N., Del Rossi, G., Adams, J. B., Abderlahman, K., Asfour, S. A., Roos, B. A., and Signorile, J. F. (2010), "Simple equations to predict concentric lower-body muscle power in older adults using the 30-second chair-rise test: a pilot study", *Clinical interventions in aging*, Vol. 5, p. 173 2010
- Studenski, S. A., Peters, K. W., Alley, D. E., Cawthon, P. M., McLean, R. R., Harris, T. B., Ferrucci, L., Guralnik, J. M., Fragala, M. S., Kenny, A. M. et al. (2014), "The FNIH sarcopenia project: rationale, study description, conference recommendations, and final estimates", *Journals of Gerontology Series A: Biomedical Sciences and Medical Sciences*, Vol. 69, No. 5, pp. 547–558 2014
- Takai, Y., Ohta, M., Akagi, R., Kanehisa, H., Kawakami, Y., and Fukunaga, T. (2009), "Sit-to-stand test to evaluate knee extensor muscle size and strength in the elderly: a novel approach", *Journal of physiological anthropology*, Vol. 28, No. 3, pp. 123–128 2009
- Tyrovolas, S., Koyanagi, A., Olaya, B., Ayuso-Mateos, J. L., Miret, M., Chatterji, S., Tobiasz-Adamczyk, B., Koskinen, S., Leonardi, M., and Haro, J. M. (2016), "Factors associated with skeletal muscle mass, sarcopenia, and sarcopenic obesity in older adults: a multi-continent study", *Journal of cachexia, sarcopenia and muscle*, Vol. 7, No. 3, pp. 312–321 2016
- Van Lummel, R., Ainsworth, E., Lindemann, U., Zijlstra, W., Chiari, L., Van Campen, P., and Hausdorff, J. (2013), "Automated approach for quantifying the repeated sit-to-stand using one body fixed sensor in young and older adults", *Gait & posture*, Vol. 38, No. 1, pp. 153–156 2013
- Vincenzo, J. L., Gray, M., and Glenn, J. M. (2018), "Validity of a novel, clinically relevant measure to differentiate functional power and movement velocity and discriminate fall history among older adults: a pilot investigation", *Innovation in aging*, Vol. 2, No. 3, p. igyo28 2018
- Weiss, A., Herman, T., Plotnik, M., Brozgol, M., Maidan, I., Giladi, N., Gurevich, T., and Hausdorff, J. M. (2010), "Can an accelerometer enhance the utility of the Timed Up & Go Test when evaluating patients with Parkinson's disease?", *Medical engineering & physics*, Vol. 32, No. 2, pp. 119–125 2010
- Wilson, S. K. M. and Nicol, A. C. (2005), "Load distribution during sit-stand-sit using an instrumented chair", in XXth Congress of the International Society of Biomechanics 2005
- Witten, I. H., Frank, E., Hall, M. A., and Pal, C. J., *Data Mining: Practical machine learning tools and techniques*, Morgan Kaufmann 2016
- Zhang, W., Regterschot, G. R. H., Geraedts, H., Baldus, H., and Zijlstra, W. (2015), "Chair rise peak power in daily life measured with a pendant sensor associates with mobility, limitation in activities, and frailty in old people", *IEEE journal of biomedical and health informatics*, Vol. 21, No. 1, pp. 211–217 2015