

SUPPLEMENTARY FILE

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Supplement to: *Modelling and in vivo evaluation of tendon forces and loads in dynamic rehabilitation exercises: a scoping review*

Adrian Escriche-Escuder, Antonio I. Cuesta-Vargas, José Casaña

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Appendix S1. Detailed information sources and search strategy

	Pubmed	EMBASE	WOS	Google Scholar (200 primeras)
Tendon AND Load	3837	4311		200
Tendon [Title] AND Load [Title]	100	183	536	
Tendon [Title] AND Force [Title]	185	202	297	
Tendon [Title] AND Biomechanics [Title]	90	111	83	
Tendon AND wave	893	1220	1282	200
Tendon [Title] AND Properties [Title]	685	755	801	
Tendon AND Force				200
Tendon AND Biomechanics				200
Tendon AND Properties				200
	5790	6782	2999	1000
Total	16571			

Appendix S2. Articles excluded with full-text with reasons

Autor and year	Title	Reasons for exclusion
Acuna et al. 2019	Achilles tendon shear wave speed tracks the dynamic modulation of standing balance	No tendon forces/load evaluation
Aita et al. 1998	The load applied to the foot in a patellar ligament-bearing cast	No tendon forces/load evaluation
Andarawis-Puri et al. 2010	Infraspinatus and supraspinatus tendon strain explained using multiple regression models.	No tendon forces/load evaluation
Ando et al. 2019	Positive relationship between passive muscle stiffness and rapid force production	No tendon forces/load evaluation
Ateş et al. 2015	Muscle shear elastic modulus is linearly related to muscle torque over the entire range of isometric contraction intensity	No tendon forces/load evaluation
Beck et al. 2020	Cyclically producing the same average muscle-tendon force with a smaller duty increases metabolic rate	No tendon forces/load evaluation
Bobbert et al. 1986	An estimation of power output and work done by the human triceps surae muscle-tendon complex in jumping	No tendon forces/load evaluation
Bojsen-Møller et al. 2003	Measuring mechanical properties of the vastus lateralis tendon-aponeurosis complex in vivo by ultrasound imaging	No tendon forces/load evaluation
Bojsen-Møller et al. 2005	Muscle performance during maximal isometric and dynamic contractions is influenced by the stiffness of the tendinous structures	No tendon forces/load evaluation
Bolus et al. 2021	Fit to Burst: Toward Noninvasive Estimation of Achilles Tendon Load Using Burst Vibrations	Proof-of-concept study
Breda et al. 2020	The association between patellar tendon stiffness measured with shear-wave elastography and patellar tendinopathy—a case-control study	No tendon forces/load evaluation
Bruggemann 1985	Mechanical load on the Achilles-tendon during rapid dynamic sport movements	Wrong publication type (Book chapter)
Brum et al. 2013	In Vivo Achilles Tendon Elasticity Assessment using	No tendon forces/load evaluation

	Supersonic Shear Imaging: a feasibility study	
Bujalski et al. 2018	A Monte Carlo analysis of muscle force estimation sensitivity to muscle-tendon properties using a Hill-based muscle model	No tendon forces/load evaluation
Burgess et al. 2007	Plyometric vs. Isometric training influences on tendon properties and muscle output	Tendon forces are used as part of the calculation of other parameters and not reported as evaluation results
Cao et al. 2019	A multicenter large-sample shear wave ultrasound elastographic study of the achilles tendon in chinese adults	No tendon forces/load evaluation
Cattagni et al. 2017	No Alteration of the Neuromuscular Performance of Plantar-Flexor Muscles After Achilles Tendon Vibration	No tendon forces/load evaluation
Centner et al. 2019	Low-load blood flow restriction training induces similar morphological and mechanical Achilles tendon adaptations compared with high-load resistance training	Tendon forces are used as part of the calculation of other parameters and not reported as evaluation results
Chang et al. 2020	Strain ratio of ultrasound elastography for the evaluation of tendon elasticity	No tendon forces/load evaluation
Cheung et al. 2006	Effect of Achilles tendon loading on plantar fascia tension in the standing foot.	No dynamic exercises (No exercises evaluated)
Cordo et al. 1993	Force and displacement-controlled tendon vibration in humans	No dynamic exercises (No exercises are used)
Cordo et al. 1993	Force and displacement-controlled tendon vibration in humans	No dynamic exercises (No exercises are used)
Cruz-Montecinos et al. 2015	Estimation of tensile properties of the Achilles tendon in haemophilic arthropathy of the ankle: case study	Tendon forces are used as part of the calculation of other parameters and not reported as evaluation results
Cruz-Montecinos et al. 2019	Assessment of tensile mechanical properties of the Achilles tendon in adult patients with haemophilic arthropathy. Reproducibility study	Tendon forces are used as part of the calculation of other parameters and not reported as evaluation results
Deforth et al. 2019	The effect of foot type on the Achilles tendon moment arm and biomechanics	No tendon forces/load evaluation

Delp et al. 2007	OpenSim: open-source software to create and analyze dynamic simulations of movement.	Wrong publication type
Dennerlein et al. 1999	In vivo finger flexor tendon force while tapping on a keyswitch	No dynamic exercises (everyday tasks)
Ebrahimi et al. 2020	Shear Wave Tensiometry Reveals an Age-Related Deficit in Triceps Surae Work at Slow and Fast Walking Speeds	Tendon forces are used as part of the calculation of other parameters and not reported as evaluation results
Ejeskar et al. 1982	Finger flexion force and hand grip strength after tendon repair	No tendon forces/load evaluation
Farris et al. 2013	Differential strain patterns of the human Achilles tendon determined in vivo with freehand three-dimensional ultrasound imaging	No dynamic exercises (isometric)
Finni et al. 2008	Mechanical behavior of the quadriceps femoris muscle tendon unit during low-load contractions	No dynamic exercises (laboratory setting)
Firminger et al. 2019	Effect of Shoe and Surface Stiffness on Lower Limb Tendon Strain in Jumping	Tendon forces are used as part of the calculation of other parameters and not reported as evaluation results
Fowler and Nicol 2000	Interphalangeal joint and tendon forces: normal model and biomechanical consequences of surgical reconstruction	No dynamic exercises (everyday tasks)
Fowler et al. 1999	Measurement of external three-dimensional interphalangeal loads applied during activities of daily living	No tendon forces/load evaluation
Friesenbichler et al. 2019	Gait and strength asymmetries in patients with insertional achilles tendinopathy	No tendon forces/load evaluation
Fröberg et al. 2020	The Effect of Ankle Foot Orthosis' Design and Degree of Dorsiflexion on Achilles Tendon Biomechanics-Tendon Displacement, Lower Leg Muscle Activation, and Plantar Pressure During Walking	No tendon forces/load evaluation
Gerus et al. 2011	A method to characterize in vivo tendon force-strain relationship by combining ultrasonography,	Tendon forces are used as part of the calculation of other parameters and not

	motion capture and loading rates	reported as evaluation results
Gerus et al. 2012	Subject-Specific Tendon-Aponeurosis Definition in Hill-Type Model Predicts Higher Muscle Forces in Dynamic Tasks	Tendon forces are used as part of the calculation of other parameters and not reported as evaluation results
Giacomozzi et al. 2015	Does the thickening of Achilles tendon and plantar fascia contribute to the alteration of diabetic foot loading?	No tendon forces/load evaluation
Gomes et al. 2020	Is there a relationship between back squat depth, ankle flexibility, and Achilles tendon stiffness?	Tendon forces are used as part of the calculation of other parameters and not reported as evaluation results
Hager et al. 2020	Influence of joint angle on muscle fascicle dynamics and rate of torque development during isometric explosive contractions.	No tendon forces/load evaluation
Hansen et al. 2006	Mechanical properties of the human patellar tendon, in vivo	Tendon forces are used as part of the calculation of other parameters and not reported as evaluation results
Harding et al. 1993	Finger joint force minimization in pianists using optimization techniques	No dynamic exercises (everyday tasks)
Harlaar et al. 2020	Patellofemoral joint contact forces at different activities - effects of modeling assumptions	No tendon forces/load evaluation
Harnie et al. 2020	Acute effect of tendon vibration applied during isometric contraction at two knee angles on maximal knee extension force production	No tendon forces/load evaluation
Hashizume and Yanagiya 2016	Influences of the foot strike pattern and the running speed on the forces applied to foot	Wrong publication type (Conference proceeding)
Haufe et al. 2020	Biomechanical effects of passive hip springs during walking	No tendon forces/load evaluation
Hauraix et al. 2015	In vivo maximal fascicle-shortening velocity during plantar flexion in humans.	No tendon forces/load evaluation
Heinemeier et al. 2016	Methods of Assessing Human Tendon Metabolism and Tissue Properties in Response to Changes in Mechanical Loading	Wrong publication type (Book chapter)

Helland et al. 2013	Mechanical properties of the patellar tendon in elite volleyball players with and without patellar tendinopathy.	No tendon forces/load evaluation
Histen et al. 2017	Achilles Tendon Properties of Minimalist and Traditionally Shod Runners	Tendon forces are used as part of the calculation of other parameters and not reported as evaluation results
Hoang et al. 2007	Passive mechanical properties of human gastrocnemius muscle-tendon units, muscle fascicles and tendons in vivo	No dynamic exercises
Hof et al. 2002	Mechanics of human triceps surae muscle in walking, running and jumping	No tendon forces/load evaluation
Holzer et al. 2020	Considerations on the human Achilles tendon moment arm for in vivo triceps surae muscle-tendon unit force estimates	Wrong study design (calculations using results from other studies)
Homayuouni et al. 2015	Modeling Implantable Passive Mechanisms for Modifying the Transmission of Forces and Movements Between Muscle and Tendons	No tendon forces/load evaluation
Hopper et al. 2015	Dance floor force reduction influences ankle loads in dancers during drop landings.	No tendon forces/load evaluation
Hu et al. 2014	Biomechanical Analysis of Force Distribution in Human Finger Extensor Mechanisms	Tendon forces are used as part of the calculation of other parameters and not reported as evaluation results
Hullfish et al. 2020	A simple instrumented insole algorithm to estimate plantar flexion moments	No tendon forces/load evaluation
Jones et al. 1985	Effect of muscle tendon vibration on the perception of force	No tendon forces/load evaluation
Joseph et al. 2014	Achilles tendon biomechanics in response to acute intense exercise.	No dynamic exercises
Kathy Cheng et al. 2008	Finite element analysis of plantar fascia under stretch— The relative contribution of windlass mechanism and Achilles tendon force	Wrong study design (Finite element analysis)/ No tendon forces/load evaluation
Kawakami et al. 2002	Effect of series elasticity on isokinetic torque-angle relationship in humans.	Tendon forces are used as part of the calculation of other parameters and not

		reported as evaluation results
Kawakami et al. 2002	In vivo muscle fibre behaviour during counter-movement exercise in humans reveals a significant role for tendon elasticity	No dynamic exercises (laboratory setting)
Kaya and Yucesoy 2020	Muscle-tendon unit length-spastic muscle force data by combined intraoperative-musculoskeletal modelling work	No tendon forces/load evaluation
Kernozek et al. 2016	Comparing Two Methods for Estimating Achilles Tendon Loading during Running	Wrong publication type (Conference proceeding)
Kernozek et al. 2018	The effects of habitual foot strike patterns on Achilles tendon loading in female runners	Tendon forces are used as part of the calculation of other parameters and not reported as evaluation results
Kongsgaard et al. 2006	Decline eccentric squats increases patellar tendon loading compared to standard eccentric squats	No dynamic exercises
Kouno et al. 2019	Effects of the strain rate on mechanical properties of tendon structures in knee extensors and plantar flexors in vivo	No dynamic exercises
Kruse et al. 2019	Effects of serial casting on muscle-tendon properties, muscle function and gait in a healthy child with calf muscle shortening	No tendon forces/load evaluation
Kubo et al. 1999	Influence of elastic properties of tendon structures on jump performance in humans	No tendon forces/load evaluation
Kubo et al. 2000	Elastic properties of muscle-tendon complex in long-distance runners	No tendon forces/load evaluation
Kubo et al. 2001	Influence of static stretching on viscoelastic properties of human tendon structures in vivo	No tendon forces/load evaluation
Kubo et al. 2002	Measurement of viscoelastic properties of tendon structures in vivo	No tendon forces/load evaluation
Kubo et al. 2003	Gender differences in the viscoelastic properties of tendon structures	No tendon forces/load evaluation
Kubo et al. 2005	Effects of cold and hot water immersion on the mechanical	No dynamic exercises

	properties of human muscle and tendon in vivo.	
Kubo et al. 2015	Relationship between elastic properties of tendon structures and performance in long distance runners	No tendon forces/load evaluation
Kubo et al. 2015	Relationship between Achilles tendon properties and foot strike patterns in long-distance runners	No tendon forces/load evaluation
Kubo et al. 2020	Mechanical properties of muscle and tendon at high strain rate in sprinters	No tendon forces/load evaluation
Lee et al. 2015	Repeatability and agreement of digital image correlation (DIC) for regional strain estimates of the in-vivo human patellar tendon	No tendon forces/load evaluation
Lian et al. 1996	Characteristics of the leg extensors in male volleyball players with jumper's knee	No tendon forces/load evaluation
Lian et al. 2003	Performance characteristics of volleyball players with patellar tendinopathy	No tendon forces/load evaluation
Lichtwark et al. 2006	Interactions between the human gastrocnemius muscle and the Achilles tendon during incline, level and decline locomotion.	Tendon forces are used as part of the calculation of other parameters and not reported as evaluation results
Lichtwark et al. 2011	Achilles tendon (3D): Do the mechanical properties of tendon change in response to exercise?	Wrong publication type (Conference proceeding)
Lima et al. 2017	Triceps surae elasticity modulus measured by shear wave elastography is not correlated to the plantar flexion torque	No tendon forces/load evaluation
Lu et al. 2013	Quantifying Catch-and-Release: The Extensor Tendon Force Needed to Overcome the Catching Flexors in Trigger Fingers	No dynamic exercises (everyday tasks)
Mademli et al. 2008	Age-related effect of static and cyclic loadings on the strain-force curve of the vastus lateralis tendon and aponeurosis	No dynamic exercises
Marouane et al. 2017	Changes in Knee Adduction Rotation and not Adduction Moment Influence Joint	Wrong publication type (Conference proceeding)

	Compartmental Load Partitioning	
Martin et al. 2012	Effects of the index finger position and force production on the flexor digitorum superficialis moment arms at the metacarpophalangeal joints - a magnetic resonance imaging study.	No tendon forces/load evaluation
Martin et al. 2018	Gauging force by tapping tendons	No tendon forces/load evaluation
Matsubayashi et al. 2008	Ultrasonographic measurement of tendon displacement caused by active force generation in the psoas major muscle	No tendon forces/load evaluation
McCrum et al. 2018	Loading rate and contraction duration effects on in vivo human Achilles tendon mechanical properties	Tendon forces are used as part of the calculation of other parameters and not reported as evaluation results
McMahon et al. 2013	The manipulation of strain, when stress is controlled, modulates in vivo tendon mechanical properties but not systemic TGF- β 1 levels	Tendon forces are used as part of the calculation of other parameters and not reported as evaluation results
McNair et al. 2013	Biomechanical properties of the plantar flexor muscle-tendon complex 6 months post-rupture of the Achilles tendon	No tendon forces/load evaluation
Mileusnic et al. 2009	Force estimation from ensembles of Golgi tendon organs	No tendon forces/load evaluation
Mimura 1986	[The load-bearing function of a patellar tendon bearing cast]	No tendon forces/load evaluation
Monte 2021	In vivo manipulation of muscle shape and tendinous stiffness affects the human ability to generate torque rapidly	No tendon forces/load evaluation
Nicol et al. 1998	Significance of passively induced stretch reflexes on achilles tendon force enhancement	No active exercises evaluated
Nicol et al. 1999	Quantification of Achilles tendon force enhancement by passively induced dorsiflexion stretches	No active exercises evaluated
Okuyama et al. 2019	Study on fingertip force sensor based on measurement of tendon tension	Tendon forces are used as part of the calculation of other parameters
Olszewski et al. 2015	Achilles tendon moment arms: the importance of measuring at	No dynamic exercises

	constant tendon load when using the tendon excursion method.	
Pearson et al. 2013	The use of normalized cross-correlation analysis for automatic tendon excursion measurement in dynamic ultrasound imaging.	Tendon forces are used as part of the calculation of other parameters and not reported as evaluation results
Peltonen et al. 2013	Viscoelastic properties of the Achilles tendon in vivo	Tendon forces are used as part of the calculation of other parameters and not reported as evaluation results
Perl et al. 2012	Effects of Footwear and Strike Type on Running Economy	No tendon forces/load evaluation (no data)
Petrescu et al. 2016	Evaluation of normal and pathological Achilles tendon by real-time shear wave elastography	No tendon forces/load evaluation (no data)
Rowley et al. 2000	The effect of the patellar tendon-bearing cast on loading	No tendon forces/load evaluation
Salman et al. 2019	Spatial Variations in Achilles Tendon Shear Wave Speed Using a Cost-Effective Method of Accelerometers	Wrong publication type (Conference proceeding)
Saltzman et al. 1992	The patellar tendon-bearing brace as treatment for neurotrophic arthropathy: a dynamic force monitoring study.	No tendon forces/load evaluation
Sasaki et al. 2019	Electromyographic analysis of infraspinatus and scapular muscles during external shoulder rotation with different weight loads and positions.	No tendon forces/load evaluation
Sheehan et al. 2000	Human patellar tendon strain. A noninvasive, in vivo study	No tendon forces/load evaluation
Sinsel et al. 2013	The musculoskeletal loading profile of the thumb during pipetting based on tendon displacement	No tendon forces/load evaluation during exercises
Slane et al. 2014	Non-uniform displacements within the Achilles tendon observed during passive and eccentric loading	No tendon forces/load evaluation
Stafilidis et al. 2007	Muscle-tendon unit mechanical and morphological properties and sprint performance	Tendon forces are used as part of the calculation of other parameters and not reported as evaluation results

Stanojev et al. 2018	Effects of patellar tendon strap bracing on the motor performance and biomechanics of healthy adolescent athletes	Wrong publication type (Conference proceeding)
Stegman et al. 2009	A feasibility study for measuring accurate tendon displacements using an audio-based Fourier analysis of pulsed-wave Doppler ultrasound signals.	Wrong publication type (Conference proceeding)
Sugisaki et al. 2011	Effect of muscle contraction levels on the force-length relationship of the human Achilles tendon during lengthening of the triceps surae muscle-tendon unit	Tendon forces are used as part of the calculation of other parameters and not reported as evaluation results
Sussmilch-Leitch et al. 2012	Effect of foot orthoses on ankle kinematics and kinetics in male runners with Achilles tendinopathy	Wrong publication type (Conference proceeding)
Taniguchi 1988	[The load bearing function of patellar tendon bearing brace--on the relation between shaft length and rate of load bearing]	No tendon forces/load evaluation
Thomeer et al. 2020	Load Distribution at the Patellofemoral Joint During Walking.	No tendon forces/load evaluation
Totorean et al. 2014	The role of plantar pressure evaluation in rehabilitation of patients with Achilles tendon ruptures	No tendon forces/load evaluation
Ullrich et al. 2010	Influence of length-restricted strength training on athlete's power-load curves of knee extensors and flexors	No tendon forces/load evaluation
Ushiyama et al. 2005	Difference in aftereffects following prolonged Achilles tendon vibration on muscle activity during maximal voluntary contraction among plantar flexor synergists	No tendon forces/load evaluation
Veeger et al. 2002	Load on the shoulder in low intensity wheelchair propulsion.	No tendon forces/load evaluation
Wearing et al. 2019	Do habitual foot-strike patterns in running influence functional Achilles tendon properties during gait?	No tendon forces/load evaluation
Wearing et al. 2020	Transmission-Mode Ultrasound for Monitoring the Instantaneous Elastic Modulus of the Achilles Tendon During	No tendon forces/load evaluation

	Unilateral Submaximal Vertical Hopping	
Werkhausen et al. 2018	Effect of training-induced changes in achilles tendon stiffness on muscle–tendon behavior during landing	No tendon forces/load evaluation
Werkhausen et al. 2019	Distinct muscle-tendon interaction during running at different speeds and in different loading conditions.	No tendon forces/load evaluation
Westphal et al. 2013	Load-Dependent Variations in Knee Kinematics Measured with Dynamic MRI	No dynamic exercises (No exercises are used)
Woodburn et al. 2013	Achilles tendon biomechanics in psoriatic arthritis patients with ultrasound proven enthesitis	The method of evaluating tendon forces is not specified.
Wretenberg et al. 1993	Passive knee muscle moment arms measured in vivo with MRI	No active exercises
Wu et al. 2013	The musculoskeletal loading profile of the thumb during pipetting based on tendon displacement	No tendon forces/load evaluation
Yamaguchi et al. 2002	Effect of different frequencies of skipping rope on elastic components of muscle and tendon in human triceps surae	Wrong language (Japanese)
Yamamoto et al. 2020	Effects of Varying Plantarflexion Stiffness of Ankle-Foot Orthosis on Achilles Tendon and Propulsion Force during Gait	No tendon forces/load evaluation
Yoshitake et al. 2004	Fluctuations in plantar flexion force are reduced after prolonged tendon vibration	No tendon forces/load evaluation