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RELIABILITY OF MAKE AND BREAK TESTS IN ASSESSING INTRINSIC FOOT MUSCLE STRENGTH USING A HANDHELD DYNAMOMETER IN HEALTHY YOUNG ADULTS

ORIGINAL ARTICLE

ABSTRACT

Purpose: The make and break tests are used in isometric muscle measurement via a handheld dynamometer. This study aimed to compare the reliability of intrinsic foot muscle strength assessment with break and make tests in healthy young adults.

Methods: Seventy-five healthy adults completed the test-retest protocol with five days between tests. The maximal isometric strength measure of intrinsic foot muscles was measured during make/break tests using a handheld dynamometer. Test-retest reliability was calculated using intra-class correlation coefficients (ICC). Minimal detectable changes were calculated using standard error measurements.

Results: According to the analysis, the strength results of the break test were higher in all muscles when compared to the make test ($p<0.05$). The strength measurements of the intrinsic foot muscles was found to have almost perfect test-retest reliability in the make and break test (ICC=0.938-0.986).

Conclusion: Healthy adults showed stable test-retest results on all muscle strength measurements of the intrinsic foot muscles. The make and break test carried out usnig the handheld dynamometer is a reliable method for assessing intrinsic foot muscle strength in healthy adults. Both make and break tests are reliable measurements for the strength of intrinsic foot muscles.

Key Words: Adult; Foot; Muscle Strength; Reproducibility.

SAĞLIKLI GENÇ YETİŞKİNLERDE DİNAMOMETRE İLE İNTRİNSİK AYAK KAS KUVVETİ DEĞERLENDİRİLMESİNDE "MAKE" VE "BREAK" TESTLERİNİN GÜVENİRLİĞİ

ARAŞTIRMA MAKALESİ

ÖZ

Amaç: "Make" ve "break" testleri el dinamometreleri ile izometrik kas kuvvet ölçümü sırasında kullanılan değerlendirme teknikleridir. Bu çalışmanın amacı, sağlıklı genç yetişkinlerde el dinamometresi ile yapılan "make" ve "break" testlerinin intrinsik ayak kas kuvveti değerlendirmesinde güvenirliğinin incelenmesiydi.

Yöntem: Yetmiş beş sağlıklı yetişkin test-tekrar test protokolünü beş gün ara ile tamamladı. İntrinsik ayak kaslarının maksimum izometrik kuvvet ölçümü "make" ve "break" testleri ile dijital el dinamometresi kullanılarak ölçüldü. Test-tekrar test güvenirliği sınıf içi korelasyon katsayıları (ICC) kullanılarak hesaplandı. Minimal tespit edilebilir değişiklikler, standart hata ölçümleri kullanılarak hesaplandı.

Sonuçlar: Analizlere göre, "break" testinin kuvvet sonuçlarının tüm kaslarda "make" testine göre daha yüksek olduğu bulundu ($p<0,05$). İntrinsik ayak kaslarının kuvvet ölçümlerinin, hem "make" hem de "break" testinde neredeyse mükemmel bir test-tekrar test güvenirliğine sahip olduğu belirlendi (ICC=0,938-0,986).

Tartışma: Sağlıklı yetişkinlerin, intrinsik ayak kaslarının tüm kas kuvveti ölçümlerinde test-tekrar test sonuçlarının stabil olduğu gösterilmiştir. El dinamometresi ile değerlendirilen "make" ve "break" testleri sağlıklı yetişkinlerde intrinsik ayak kaslarının kuvvet ölçümünde güvenilir yöntemlerdir.

Anahtar Kelimeler: Yetişkin; Ayak; Kas Kuvveti; Tekrarlanabilirlik.

INTRODUCTION

The human foot is a complex structure, which serves functions such as support and mobility. These functions are accomplished through the arch's deformation controlled by intrinsic and extrinsic foot muscles (1). The intrinsic muscles have an essential role in the dynamic stabilization of the foot due to their structurally short force levers and small diameters (2,3). Many studies are have reported that intrinsic foot muscle weakness is directly related to pathologies such as structural or functional toe deformities, pes planus, hallux valgus, and plantar fasciitis (4-9). Therefore, it is essential to evaluate these muscles' strength objectively and reliably (10).

Health professionals frequently prefer manual muscle testing (MMT) because it is useful in clinical practice. However, MMT is a subjective and non-sensitive method, and it could only provide subjective information for clinicians (11). Measurement methods that assess muscle strength precisely are necessary for better clinical decision making with more objective and reliable results. A digital handheld dynamometer (HHD) is a device used in the objective measurement of muscle strength. HHDs are easy to use, inexpensive, allow comparison, and could objectively display the amount of force used in the muscle test (12). Although instruments have been developed for objective measurement of muscle strength, the method of measurement, the patient's condition, position, or clinician's measurement technique may change the measurement results. Additionally, it is still controversial whether muscle strength testing should be performed in the muscles' shortest position or during movement (11).

Measuring the strength of intrinsic foot muscles is vital for preventing pathologies or slowing their progression. Isokinetic devices usually used for objective evaluation of muscle strength cannot be used in these small muscles. In scientific studies, reliable methods are necessary for the objective evaluation of muscle strength. Therefore, this study aimed to compare the reliability of intrinsic foot muscle strength assessment with make test (MT) and break test (BT) using a HHD in healthy young adults. In this context, we hypothesized that no difference would be observed between make/break tests.

METHODS

Participants

Seventy-five healthy adults (36 males, 39 females) completed the test-retest protocol with five days between the tests. Those who were 18-40 years of age, had a body mass index (BMI) of (18.5 kg/m^2 ≤ BMI ≤ 24.9 kg/m^2) were included in the study. Those who had any neurological problems, had a history of lower extremity trauma or surgery, were diagnosed with a severe low back problem, had vestibular or visual system problems, had a navicular drop test >10 mm and limitation of the first metatarsophalangeal joint range of motion (hallux rigidus-limitus) were excluded from the study. Before recruiting participants for this study, a power analysis was performed with GPower Version 3.1.9.5 (Universität Kiel, Kiel, Germany), and the target sample size was reached with a probability of 0.05 and 80% power. Written informed consent forms were obtained from the participants stating that they were willing to participate in the study. This study was approved by the Ethical Committee of Gazi University with the approval number of 2019-346 (Approval Date: 11.11.2019, and Approval Number: 2019-346) and the author followed the ethical guidelines of the 1975 Declaration of Helsinki.

Study Design and Procedures

This study had a cross-sectional design that included healthy adults. The study was conducted from January 2020 to April 2020 at Gazi University. Upon arrival at the first assessment, the participants filled out informed consent and medical history form that included demographic information and answered questions determining inclusion/exclusion criteria for the study.

A digital HHD (Lafayette® Instrument Company Model-01165, Indiana, USA) was used for measuring the maximum voluntary isometric contraction of the intrinsic foot muscles in Newtons, for comparing with the MT and BT results. Two different methods are used in measuring muscle strength via an HHD; the MT and the BT (13).

During these tests, the examiner and participants play opposite roles. The MT requires a body part is positioned at the start of its range of motion, and the participant is asked to exert maximal force against the examiner. In a BT, increasing force is applied to a body part after it has completed its range of motion until the subject's maximal muscle force is overcome, and the joint being tested gives way (14). In the two tests, force is applied differently; the dynamometer receives different amounts of force, and different results may be generated (14). All measurements were repeated after five days to assess test-retest reliability. The order of the MT and BT was randomized by flipping a coin. The strength measurement of the dominant side was performed as a tested side. A ball was placed in the middle of two feet while the individual was standing to determine the dominant foot. The individual was asked to kick the ball with his/her foot. The foot that the individual kicked the ball was considered dominant (15). Three different padded plastic stirrups of the dynamometer were used during the assessment. The appropriate stirrup was selected by the evaluator based on the region to be measured. Among the intrinsic plantar muscles, m. abductor hallucis (AH), m. flexor hallucis brevis (FHB), m. flexor digitorum brevis (FDB), and m. flexor digiti minimi (FDM) muscles were evaluated in the stated order. The ankles of the participants were stabilized by the evaluator to prevent lower limb compensation. While evaluating hallux and toe flexors, the ankle was passively positioned at maximum plantar flexion, and the effect of co-contraction of ankle plantar flexors on the outcome was prevented. The dynamometer position was adjusted not to allow interphalangeal joint flexion to minimize and inhibit long flexors' effect, and measurements were performed at this position. Evaluations were performed according to MT and BT protocols separately (16). Before the experimental procedure, the participants were familiarized with the MT and BTs to minimize measurement errors. Assessment trials were performed until the participant understood the test precisely. After the trial application, three measurements were performed, and the highest result was included in the analysis. A 30 s rest period was given to prevent fatigue between measurements. Tests were evaluated by the same physiotherapist, with the individuals in the semi-sitting position with hip and knee at semi-flexion (16).

Statistical Analysis

Statistical analysis was conducted using the SPSS for Windows version 22.0 (Statistical Package for Social Sciences Inc, Chicago, IL, USA) computer software system. The variables were investigated using visual (histograms, probability plots) and analytical methods (Kolmogorov-Smirnov/ Shapiro-Wilk's test) to determine whether they are normally distributed. Descriptive analyses were presented using means and standard deviations (SD) for normally distributed variables. Systematic differences were identified using a paired t-test. Statistical significance for this study was set at $p<0.05$ level. For the reliability, test-retest analysis intra-class correlation coefficient (ICC) with absolute agreement and 95% confidence interval (CI) were determined between the first and second assessments. The minimal detectable change (MDC), also referred to as the "smallest detectable difference," is an absolute measure of reliability, which accounts for various variability in defining a confidence interval in units of the measure. The MDC is the smallest change one could measure above the systematic error. The MDC was calculated by multiplying the SD of the difference with 1.96. When evaluating interventions, the pre-post difference must be more significant than the MDC to express real improvement. The standard error of measurement (SEM) also provides a measure of variability, it was primarily used for calculating the MDC. The SEM values were calculated as follows: $SEM=SD\times\sqrt{(1 - ICC)}$, The ICC values were defined as; almost perfect (higher than 0.81), high (0.61-0.80), moderate (0.41-0.60), fair (0.21-0.40) (17).

RESULTS

A total of 75 healthy young adults were enrolled in this study (mean age=24.40±5.60 years). In the BT the strength of all muscles was significantly higher compared to those of the MT ($p<0.05$, Table 1). The intrinsic foot muscles were found to have almost perfect test-retest reliability both in the MT (ICC varied from 0.954 to 0.986, Figure 1), and the BT (ICC varied from 0.938 to 0.978, Figure 1). There was no significant difference between the test and

Table 1: Make and Break Test Results of the Participants.

Muscles		Make Test Mean±SD	Break Test Mean±SD	p
M. Abductor Hallucis (N)	**Dominant**	17.31±6.72	26.29±9.91	**<0.001***
	Non-Dominant	15.72±6.23	24.91±92.06	**<0.001***
M. Flexor Hallucis Brevis (N)	**Dominant**	96.04±29.11	114.27±31.70	**<0.001***
	Non-Dominant	93.83±30.15	114.11±35.03	**<0.001***
M. Flexor Digitorum Brevis (N)	**Dominant**	72.52±20.13	93.81±22.06	**<0.001***
	Non-Dominant	69.01±18.92	84.00±20.63	**<0.001***
M. Flexor Digiti Minimi (N)	**Dominant**	24.78±9.03	31.14±9.68	**<0.001***
	Non-Dominant	24.30±8.88	29.96±9.92	**<0.001***

*p<0.05.

re-test mean scores according to paired t-test for any intrinsic foot muscle strength measures, which indicates an absence of any systematic bias (p>0.05). The ICC, 95% CI, SEM, MDC, Mean, SD, and level of significance (p) values of test and re-test intrinsic foot muscle strength measurements of dominant and non-dominant sides are presented in Table 2.

DISCUSSION

This study provided evidence related to test–re-test reliability and MDC values of intrinsic foot muscle strength assessment via the MT and BT in healthy young adults. The present study showed that the MT and BT strength measurement tests of the intrinsic foot muscles via HHD were reliable. This

Table 2: The Reliability of the Make and Break Test Results.

Test			ICC	95% CI		SEM	MDC	Test	Re-test	p
				Lower Bound	Upper Bound			Mean±SD	Mean±SD	
Make Test	**M. Abductor Hallucis**	**Dominant**	0.954	0.927	0.971	1.44	3.99	17.11±6.58	17.51±6.80	0.255
		Non-Dominant	0.961	0.923	0.974	1.32	3.66	15.58±6.21	16.64±7.22	0.419
	M. Flexor Hallucis Brevis	**Dominant**	0.981	0.970	0.988	4.02	11.14	95.82±29.22	96.16±29.17	0.665
		Non-Dominant	0.986	0.978	0.991	3.58	9.92	94.19±30.38	93.38±30.12	0.321
	M. Flexor Digitorum Brevis	**Dominant**	0.965	0.944	0.978	3.76	10.42	71.90±18.89	73.13±21.26	0.162
		Non-Dominant	0.957	0.933	0.973	3.94	10.92	69.11±19.51	69.02±18.52	0.948
	M. Flexor Digiti Minimi	**Dominant**	0.964	0.940	0.977	1.76	4.88	24.57±9.33	25.51±9.30	0.242
		Non-Dominant	0.966	0.935	0.977	1.67	4.63	24.02±9.09	25.17±9.02	0.062
Break Test	**M. Abductor Hallucis**	**Dominant**	0.963	0.943	0.977	1.91	5.29	26.29±9.79	26.32±10.11	0.936
		Non-Dominant	0.976	0.954	0.984	1.37	3.80	24.63±8.81	25.52±8.88	0.068
	M. Flexor Hallucis Brevis	**Dominant**	0.967	0.947	0.979	5.76	15.97	115.25±33.72	113.27±29.66	0.131
		Non-Dominant	0.978	0.965	0.986	5.21	14.44	114.91±35.37	113.22±34.83	0.144
	M. Flexor Digitorum Brevis	**Dominant**	0.953	0.927	0.971	4.79	13.28	93.52±21.08	94.08±23.12	0.566
		Non-Dominant	0.954	0.927	0.971	4.43	12.28	84.29±20.12	83.57±21.17	0.511
	M. Flexor Digiti Minimi	**Dominant**	0.938	0.900	0.960	2.43	6.74	31.51±9.40	30.79±10.06	0.161
		Non-Dominant	0.964	0.941	0.977	1.88	5.21	29.67±9.73	30.38±10.11	0.119

ICC: intraclass correlation coefficient, CI: confidence interval, SEM: standard error measurements, MDC: minimal detectable change.

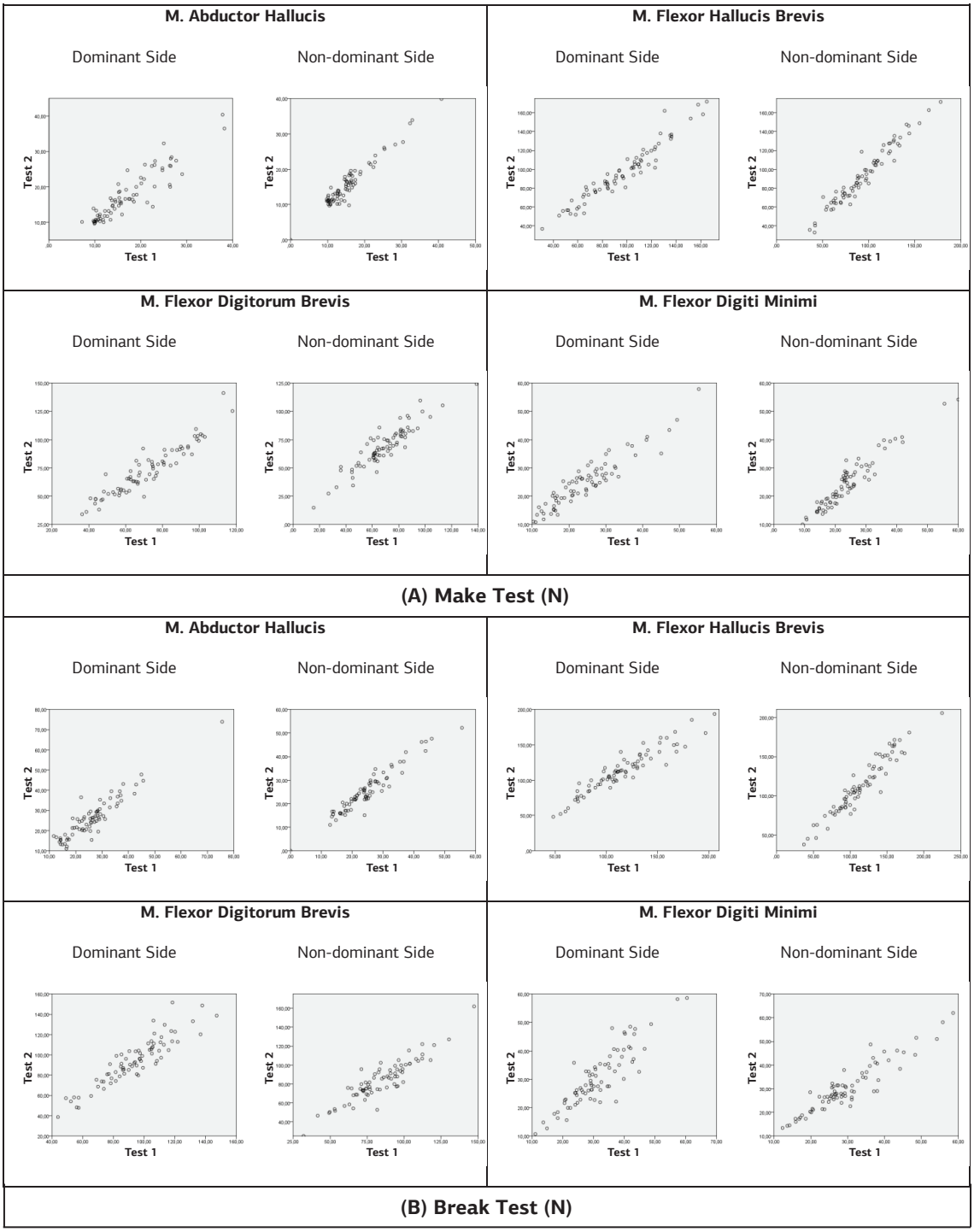

Figure 1: Unity Line Score Plots for Muscle Strength Outcome Measures (A, Make Test and B, Break Test). Dots on the Unity Line Represent Identical Test-Retest Scores.

study is the first to assess the MT and BT reliability measuring the intrinsic foot muscle strength.

Test-retest reliability involves validation of an assessment over multiple time points, and it measures the extent to which a testing measure is consistent and repeatable (18). Reliability is expressed using a correlation coefficient, which ranges from 0 to 1. The closer the coefficient is to 1, the more reliable a testing measure, suggesting

that the actual score is assessed with little error variance (18). The ICC values in the present study ranged from 0.954 to 0.986 between consecutive measurements performed in five days in the MT and 0.938 to 0.978 in BT, respectively. The present study results found that both the MT and BT had almost perfect reliability in measuring the intrinsic foot muscle strength (abductor hallucis, flexor hallucis brevis, flexor digitorum brevis, flexor digiti minimi) via HHD.

The MDC values could help identify an actual change in measured performance beyond random variations (19). The MDC values provide an understanding of reliability of the outcome measure. In this study, the MDC values for the MT ranged from 3.66 to 11.14, and the BT ranged from 3.80 to 15.97. These results showed that measuring the muscle strength of the intrinsic foot muscles via HHD has little measurement error.

In assessing the response stability of a measure, the SEM is used. The standard error in a set of repeated scores could be estimated via the SEM. Muscle strength assessments using HHD must be applicable in a clinical setting in order to be effective. The SEM for the MT ranged from 1.32 to 4.02 and the BT ranged from 1.35 to 5.76.

Even though this is the first study investigating the reliability of the MT and BT in intrinsic foot muscles using HHD, the reliability of the MTs and BTs in other muscles has been investigated in previous studies. Schmidt et al. examined the reliability of the MT and BT for hip abduction assessment using HHD and found that both tests proved to be highly reliable (20). Likely, Bohannon et al. investigated the reliability of the MT and BT for elbow flexor muscle strength in healthy subjects and reported that, both methods were reliable, and one type of testing could not be considered superior to the other (21). In the study in which they compared the MT and BT in measuring palmar abduction strength of the thumb, Lim et al. concluded that both tests were reliable (14). The results of our study are consistent with the findings of these studies. Therefore, in our opinion, when assessing muscle strength, the MT and BT could be used in a healthy population.

Jeon investigated the reliability of iliopsoas muscle strength in subjects with lumbar extension syndrome using MT and BT and concluded that the MT was more reliable than BT (22). In another study, Jeon examined gluteus medius strength using MT and BT in subjects with a pelvic drop. The author stated that MT offers a more reliable assessment of unilateral hip abductor strength in subjects with a pelvic drop (23). The fact that the populations included in these studies did not consist of healthy subjects may have led to a difference in reliability. We found, no difference found between the two assessment methods in reliability analysis. This finding is probably due to the inclusion of healthy adults.

Foot intrinsic muscles are useful in function, such as walking and balance (4-9). These muscles are small, and clinicians do not have the opportunity to measure them as simple as gross muscles. For example, the strength of a quadriceps muscle can be measured objectively via isokinetic devices. However, it is not possible to measure the strength of intrinsic foot muscles objectively with such/ devices. Therefore, the present study results concluded that both MT and BT are reliable when measuring the strength of intrinsic foot muscles. Clinicians could use both tests to measure the strength of intrinsic foot muscles.

This study has a few limitations. The participants' age range was limited to 18-40 years, and findings could not be generalized to the whole healthy adult population.

In conclusion, the current study established the reliability, MDC, and SEM values of MT and BT in healthy subjects. The evidence from this study shows that the strength measurement of the intrinsic foot muscles via HHD is reliable. Intrinsic muscle strength could be measured and reproduced using both the MT and BT.

Sources of Support: None.

Conflict of Interest: The author reports no conflicts of interest.

Ethical Approval: Gazi University Ethics Committee of Non-interventional Clinical Research approved the study (Approval Date: 11.11.2019 and Approval Number: 2019-346).

Peer-Review: Externally peer-reviewed.

Author Contributions: Concept – SÇ, GY; Design – GY; Supervision – SÇ; Resources and Financial Support– GY; Materials- GY; Data Collection and/or Processing – GY, MVY, Analysis and/or Interpretation – GY, FV; Literature Research – MVY; Writing Manuscript – GY, MVY, FV; Critical Review – SÇ.

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REFERENCES

1. McKeon PO, Hertel J, Bramble D, Davis I. The foot core system: a new paradigm for understanding intrinsic foot muscle function. Br J Sports Med. 2015;49(5):290-5.
2. Kelly LA, Farris DJ, Cresswell AG, Lichtwark GA. Intrinsic foot muscles contribute to elastic energy storage and return in the human foot. J Appl Physiol. 2019;126(1):231-8.
3. Kelly LA, Cresswell AG, Racinais S, Whiteley R, Lichtwark G. Intrinsic foot muscles have the capacity to control deformation of the longitudinal arch. J R Soc Interface. 2014;11(93):20131188.
4. Chung K, Suh B, Shy M, Cho S, Yoo J, Park S, et al. Different clinical and magnetic resonance imaging features between Charcot–Marie–Tooth disease type 1A and 2A. Neuromuscular Disord. 2008;18(8):610-8.
5. Albert SF, Apps C, Ding R, Cheung JT-M, Sterzing T, Arnold J, et al. Foot biomechanics-emerging paradigms. 2014 4th Congress of the International Foot and Ankle Biomechanics Community, April 8-11, 2014, Busan, Korea. J Foot Ankle Res. 2014;7(1):S1.
6. Headlee DL, Leonard JL, Hart JM, Ingersoll CD, Hertel J. Fatigue of the plantar intrinsic foot muscles increases navicular drop. J Electromyogr Kines. 2008;18(3):420-5.
7. Myerson M, Shereff M. The pathological anatomy of claw and hammer toes. J Bone Joint Surg Am. 1989;71(1):45-9.
8. Kwon O, Tuttle L, Johnson J, Mueller M. Muscle imbalance and reduced ankle joint motion in people with hammer toe deformity. Clin Biomech. 2009;24(8):670-5.
9. Hoffmeyer P, Cox J, Blanc Y, Meyer J, Taillard W. Muscle in hallux valgus. Clin Orthop Relat Res. 1988(232):112-8.
10. Soysa A, Hiller C, Refshauge K, Burns J. Importance and challenges of measuring intrinsic foot muscle strength. J Foot Ankle Res. 2012;5(1):29.
11. Bohannon RW. Reliability of manual muscle testing: a systematic review. Isokinet Exerc Sci. 2018;26(4):245-52.
12. Kim S-G, Lee Y-S. The intra-and inter-rater reliabilities of lower extremity muscle strength assessment of healthy adults using a hand held dynamometer. J Phys Ther Sci. 2015;27(6):1799-801.
13. Van der Ploeg R, Oosterhuis H. The "make/break test" as a diagnostic tool in functional weakness. J Neurol Neurosur Psychiatry. 1991;54(3):248-51.
14. Lim J, Toh R, Chook S, Sebastin S, Karjalainen T. A comparison of the reliability of make versus break testing in measuring palmar abduction strength of the thumb. J Hand Microsurg. 2014;6(1):8-12.
15. Van Melick N, Meddeler BM, Hoogeboom TJ, Nijhuis-van der Sanden MW, van Cingel RE. How to determine leg dominance: the agreement between self-reported and observed performance in healthy adults. PloS One. 2017;12(12):e0189876.
16. Fraser JJ, Koldenhoven RM, Saliba SA, Hertel J. Reliability of ankle-foot morphology, mobility, strength, and motor performance measures. Int J Sports Phys Ther. 2017;12(7):1134-49.
17. Landis JR, Koch GG. The measurement of observer agreement for categorical data. Biometrics. 1977;33(1):159-74.
18. Thomas JR, Nelson JK, Silverman SJ. Research methods in physical activity. Champaign, Ilinois: Human Kinetics; 2015.
19. Haley SM, Fragala-Pinkham MA. Interpreting change scores of tests and measures used in physical therapy. J Phys Ther. 2006;86(5):735-43.
20. Schmidt J, Iverson J, Brown S, Thompson PA. Comparative reliability of the make and break tests for hip abduction assessment. Physiother Theor Prac. 2013;29(8):648-57.
21. Bohannon RW. Make tests and break tests of elbow flexor muscle strength. J Phys Ther. 1988;68(2):193-4.
22. Jeon IC. Comparison of test-retest measurement reliability of iliopsoas strength between break and make test in subjects with lumbar extension syndrome. J Musculoskelet Sci Technol. 2019;3(2):54-8.
23. Jeon IC. Comparisons of test-retest reliability of strength measurement of gluteus medius strength between break and make test in subjects with pelvic drop. J Korean Phys Ther. 2019;31(3):147-50.