Testing handgrip strength, essential in assessing sarcopenia

Sarcopenia is not merely a natural consequence of aging; it is a recognized medical condition. The United States, in 2016, Japan, in 2018, and Korea, in 2021, have each designated Sarcopenia with an official disease classification code, acknowledging its status as a distinct ailment at the national level. One of the essential procedures to diagnose Sarcopenia is a handgrip strength test, which can be effectively conducted using the InGrip.

EWGSOP 2018 Sarcopenia Assessment Algorithm 2)

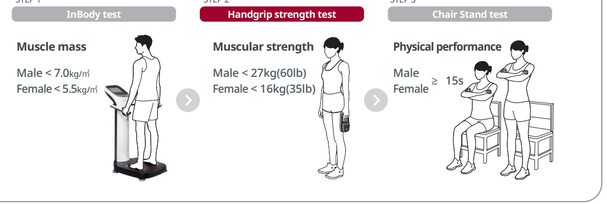
Diagnosis

Appendicular skeletal muscle mass (ASM)	Muscle strength	Physical performance
Dual-energy X-ray absorptiometry (M: 7.0 kg/m², F: 5.5 kg/m²) or Bioelectrical impedance analysis (M: <7.0 kg/m², F: <5.5 kg/m²)	Handgrip strength M: <27 kg(60lb), F: <16 kg(35lb)	6-metre walk : <0.8 m/s or 5-time chair stand test : ≥ 15 s or Short Physical Performance Battery :≤ 8

Sarcopenia
Low ASM + low muscle strength
OR Low physical performance

Severe sarcopenia
Low ASM + low muscle strength
AND Low physical performance

Simple evaluation involving InBody test + **Handgrip strength test** + Chair Stand test



1) Carlos A Celis-Morales. Associations of grip strength with cardiovascular, respiratory, and cancer outcomes and all cause mortality: prospective cohort study of half a million UK Biobank participants. BMJ 2018; 361 doi: https://doi.org/10.1136/bmj.k1651 (Published 08 May 2018)
2) Alfonso J.Cruz-Jentoft. Sarcopenia: revised European consensus on definition and diagnosis. Age and Ageing 2019;48: 16-31 doi: 10.1093/ageing/afy169 (Published electronically 24 September 2018)

InBody
See what you're made of

InBody

Measured items	Handgrip strength
Measuring range	1~100kg(2.2~220lb)
Error	± 0.5kg(± 1.1lb)
Unit of measure	0.1kg(0.22lb)
Results display	3-inch VA LCD
Power supply	3V Battery (AA type 2EA)
Interface	Wireless communication (Bluetooth5.0)
Sound	Buzzer
Size	140 (W) X 226 (L) X 50 (H): mm
Weight	Approx. 650g(1.4lb)
Operating environment	10~40°C(50~104°F), relative humidity 30~75% RH, 70~106kPa
Storage environment	-10~70°C(14~158°F), relative humidity 10~80% RH, 50~106kPa (No Condensation)

Certifications obtained by InBody

CE1639 · NAWI · ISO13485 · ISO9001 · MDSAP · GMP · 의료기기 제조 및 품질관리 기준

InBody's Intellectual Property Rights

U.S patent · Opic-cipo · China patent · Japan patent · Korea patent

For more details about the patents that we acquired, please visit our website or refer to the patent gazette of intellectual property office of each country.

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InBody

InGrip

Accuracy
At its core, the InGrip emphasizes on precision. With accurate results, it enables you to assess your current hand grip strength level and predict future well-being.

Durability
Ensuring the delivery of accurate and precise results even after prolonged use is paramount. Our meticulous design is dedicated to minimizing any margin of error with utmost durability.

Convenience
InGrip offers seamless program integration through Bluetooth wireless communication to interface directly with InBody, Body Composition Analyzer and Data Management Program.

While the Handgrip strength test may seem straightforward, it is one of the most significant biomarkers for predicting your future health.

Muscular strength is a fundamental factor that directly influences one's physical capabilities and serves as a predictive indicator for overall health. Handgrip strength, in particular, strongly correlates with one's overall body strength. This correlation makes the assessment of handgrip strength a practical alternative to gauging overall strength. Moreover, handgrip strength is an economical and convenient method for measuring muscle strength.

Numerous studies have consistently demonstrated a strong association between handgrip strength and mortality, as well as the prevalence of cardiovascular disease, chronic obstructive pulmonary disease, and various forms of cancer. Ongoing research continues to explore the health implications of handgrip strength.

In a notable study on the right, a comprehensive examination tracked the handgrip strength of 500,000 individuals aged 40 to 69 over a span of 7 years in Korea. The study aimed to unveil the connections between grip strength, mortality and increased prevalence in various chronic diseases. 1)

Hand Grip Strength (kg) / Increase of Prevalence (%)	-5kg(11lb) decreased		"Weak" Category	
	Female	Male	Female	Male
Mortality	20%	16%	39%	67%
Cardiovascular disease	15%	11%	30%	36%
COPD	20%	15%	45%	38%
Cancer	10%	6%	21%	23%

※Threshold for "weak" handgrip strength: Female <16kg(35lb), Male <26kg(57lb)

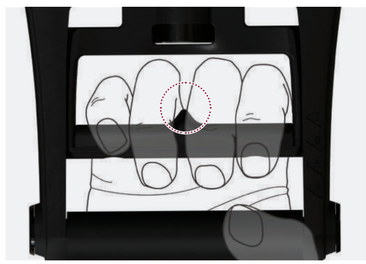
Load cell sensor for accuracy and durability

The InGrip employs a load cell method, which effectively eliminates hysteresis, a common issue with other strain gauge-based handgrip strength dynamometer. Hysteresis, often caused by "elastic deformation," occurs when a strain gauge dynamometer is used multiple times without allowing sufficient "cool down" time between measurements. This can progressively worsen hysteresis and, consequently, affect the dynamometer's calibration, resulting in inaccurate readings. With continued use of a strain gauge dynamometer, the problem exacerbates, making accurate measurements unattainable.

In contrast, the InGrip, utilizing a load cell method, is immune to hysteresis concerns. Its robust sensor ensures the delivery of accurate measurements over an extended period.

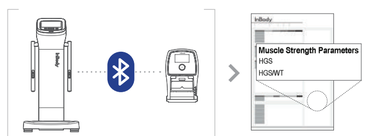
"Handle Guide" for consistent results

Previously, variations in results were common with many handgrip strength dynamometer due to the inconsistency in how users positioned their hands on the handle. This variance occurred because the load was distributed across different points on the handle, impacting the reliability of measurements. To mitigate these discrepancies, the InGrip features a "handle guide". This innovative design ensures that all users can consistently grasp the handle in the same position. Thanks to this integrated "handle guide," every user can measure their handgrip strength by applying force to the handle at the exact same position, effectively minimizing errors in the recorded values.



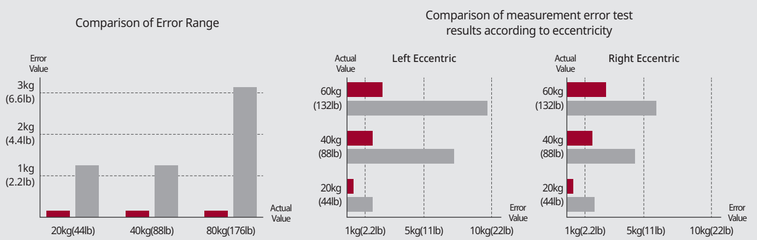
Wireless communication module

The InGrip is equipped with a wireless communication (Bluetooth) module, enabling seamless integration with other programs. Additionally, it can be seamlessly linked with the InBody, Body Composition Analyzer, unlocking a multitude of potential applications for the future.



Comparison of accuracy with existing dynamometers made by other companies

InGrip
Other companies' Handgrip Strength Dynamometer



This result shows the maximum error through repeated tests.

A handgrip strength dynamometer used to predict your health needs to be accurate.

A handgrip strength dynamometer, utilized for predicting mortality, disease incidents, and assessing muscle strength, must consistently deliver precise results.

To ensure accuracy, the InGrip features a **"load cell sensor," a "handle guide," and a "reliability inspection"** system.