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InBody

InBody Operation Instructions and Application

Precautionary Steps

Overview

With the current increase in health awareness across the globe, more people have begun to turn to the InBody System for quick and easy health assessments.

The InBody uses BIA (Bioelectrical Impedance Analysis) technology which measures "total body water" by reading the impedance of low level currents through the body. Temporary changes in the body therefore can result in temporary changes in body composition results. Thus, highlighting the importance of correctly observing all instructions including subject's posture and surrounding conditions when using the InBody System plays a critical role in obtaining accurate measurements. Because it is a medical-grade device, its protocol should be followed in the same manner that one would adhere to fasting prior to blood tests.

Developed specifically by the company's clinical team, this manual is designed to help InBody users understand the importance of observing the instructions when using the InBody System. We have included the most frequent troubleshooting requests by both new and experienced InBody users along with detailed explanations as to why these specific protocols should be adhered to. We hope that this offers practical help in getting the maximum benefits the InBody offers and in understanding its basic principle.

Thank you.

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Contents

1. Keep your arms apart from your body during the InBody measurement.

All body composition analyzers including the InBody use BIA technology to analyze body composition. BIA technology measures impedance by viewing the body as a cylinder. However, InBody divides the body into 5 cylinders: the right arm, left arm, trunk, right leg and left leg, to measure impedance.[1)]

Impedance is the amount of resistance to the current. The length and cross sectional area of objects influence resistance, hence, the amount of resistance to the current that runs through a straight cylinder and the amount of resistance to the current that runs through a bent cylinder will be different. This is because currents have the tendency to run through the shortest route.[2)]

For example, if an InBody test is performed without a shirt or with a sleeveless shirt and the arms are not kept apart from the upper body, the measurement value of upper body impedance will decrease. This is because when there is no gap in the underarm area, the arms are in fact making contact with the upper body, thereby widening the current's path and consequently, decreasing the impedance. In other words, the trunk's measurement will include some of the upper arms.

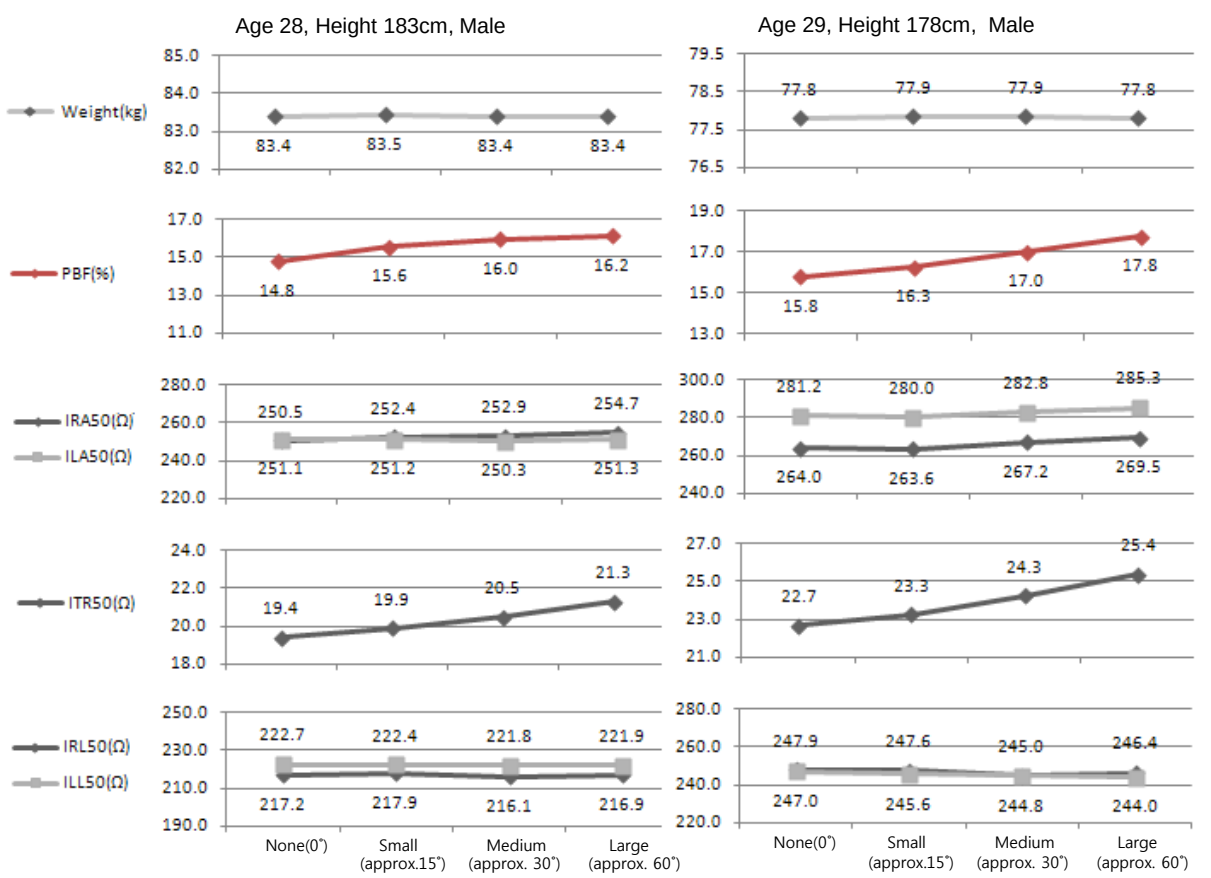
Similarly, if a measurement is carried out while wearing a pair of shorts and the thighs are not kept apart, lower body impedance will decrease. Such differences in impedance measurements lead to errors in body composition measurements. Therefore, all arms and legs must be kept straight.

According to the result of the the InBody measurement carried out on 6 participants (M=4, F=2) in their 20s, percent body fat decreased as the angle between the arm and upper body (males) decreased. However, percent body fat increased as the angle between two thighs (females) decreased due to its impact on trunk impedance.

▲ Correct Posture(O)

▲ Incorrect Posture(X)

< Changes in PBF(%) depending on the angle between the arms and the upper body >



1) Kichul Cha, The principle of Bioelectricity Impedance Kichul Cha
2) Kushner RF, Gudivaka R, Schoeller DA. Clinical characteristics influencing bioelectrical impedance analysis measurement. *Am J Clin Nutr* 1996:64(suppl):423-427.

2. Keep arms straight during the InBody measurement.

Body composition analyzers including the InBody use BIA technology to analyze body composition. BIA technology measures impedance by viewing the body as a cylinder. InBody divides the body into 5 cylinders of the right arm, left arm, trunk, right leg and left leg to measure impedance.[1)]

Impedance is the amount of current resistance. The length and cross sectional area of objects influence resistance, hence, the amount of resistance to the current that runs through a straight cylinder and the amount of resistance to the current that runs through a bent cylinder will be different. This is because currents have tendency to run through the shortest route.[2)] For example, if the InBody measurement is carried out with the arms or legs bent, impedance of each body part decreases as the length of conductor has shortened. This will lead to a decrease in percent body fat measurements.

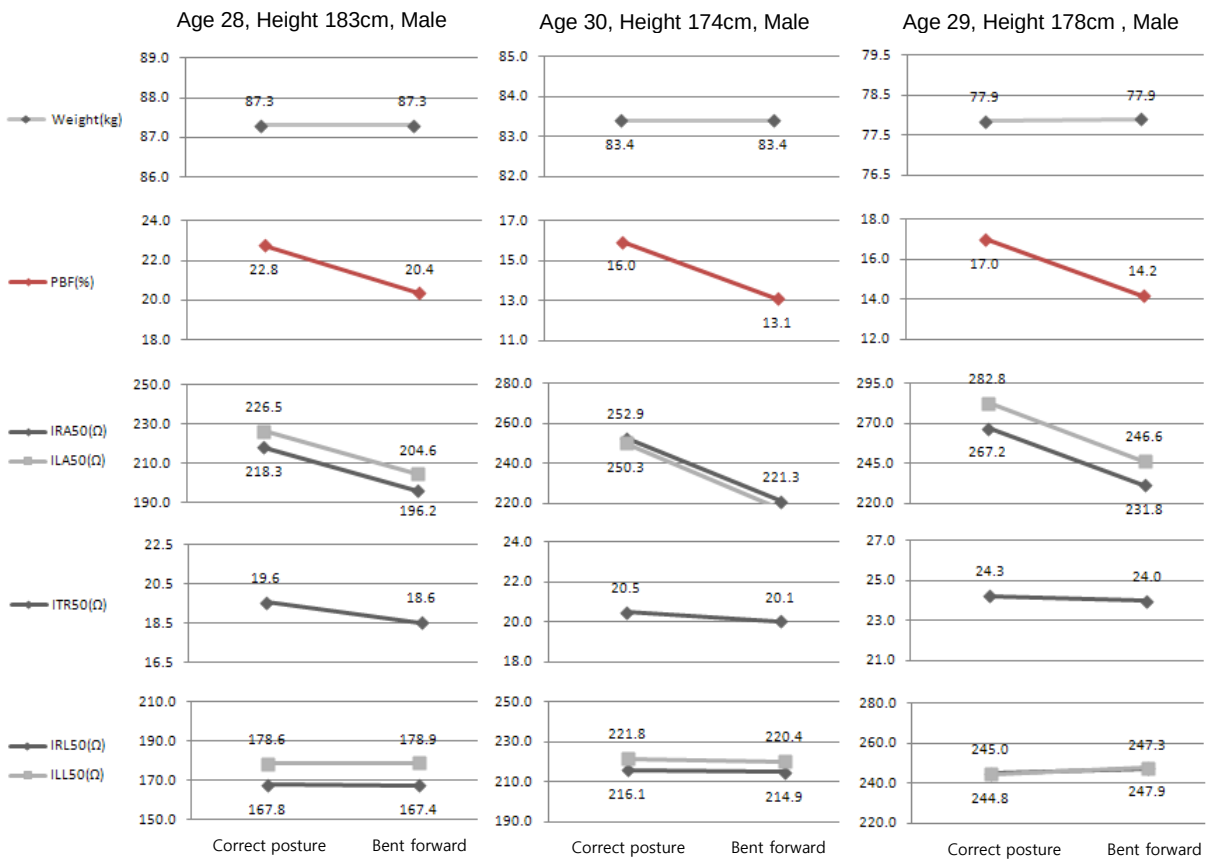
According to the result of the InBody measurement carried out on 3 male participants in their 20s, upper body impedance decreased by 15Ω ~ 34.6Ω when it was measured with arms stretched straight, resulting in a 1.3% ~ 1.7% decrease in percent body fat.

Therefore, the InBody measurement must be carried out with the arms and legs stretched straight in order to obtain an accurate measurement.

▲ Correct posture (O)

▲ Incorrect posture (X)

< Changes in PBF(%) depending on posture >



1) Kichul Cha, The principle of Bioelectricity Impedance Kichul Cha

2) Kushner RF, Gudivaka R, Schoeller DA. Clinical characteristics influencing bioelectrical impedance analysis measurement. *Am J Clin Nutr* 1996:64(suppl):423-427.

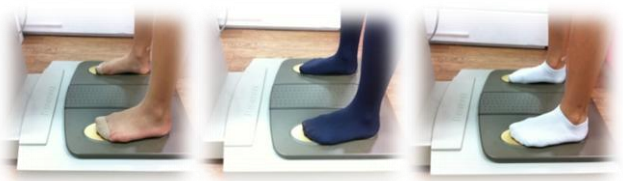
3. The InBody measurement must be carried out bare feet.

Body composition analyzers including the InBody use BIA technology to analyze body composition. BIA technology measures impedance within the body by flowing a weak current through the body. InBody uses tactile electrodes that make the palms and soles come into direct contact with electrodes made from conductors.[1)] Such an incidence creates contact resistance between the electrodes and the skin. Contact resistance is the degree of interruption in the flow of current while the current runs between conductors that have come into contact. The poorer the contact between the conductors the larger the contact resistance becomes.

Resistance (impedance) can be obtained using Ohm′s law (V=IR, where V is applied voltage and I is current running through the electrodes), and current (I) is generally influenced by contact resistance. Therefore, if a measurement is carried out while wearing socks or stockings, contact resistance becomes larger and hinders the passing of currents, which influences the measurement of body impedance and causes errors in body composition measurements.

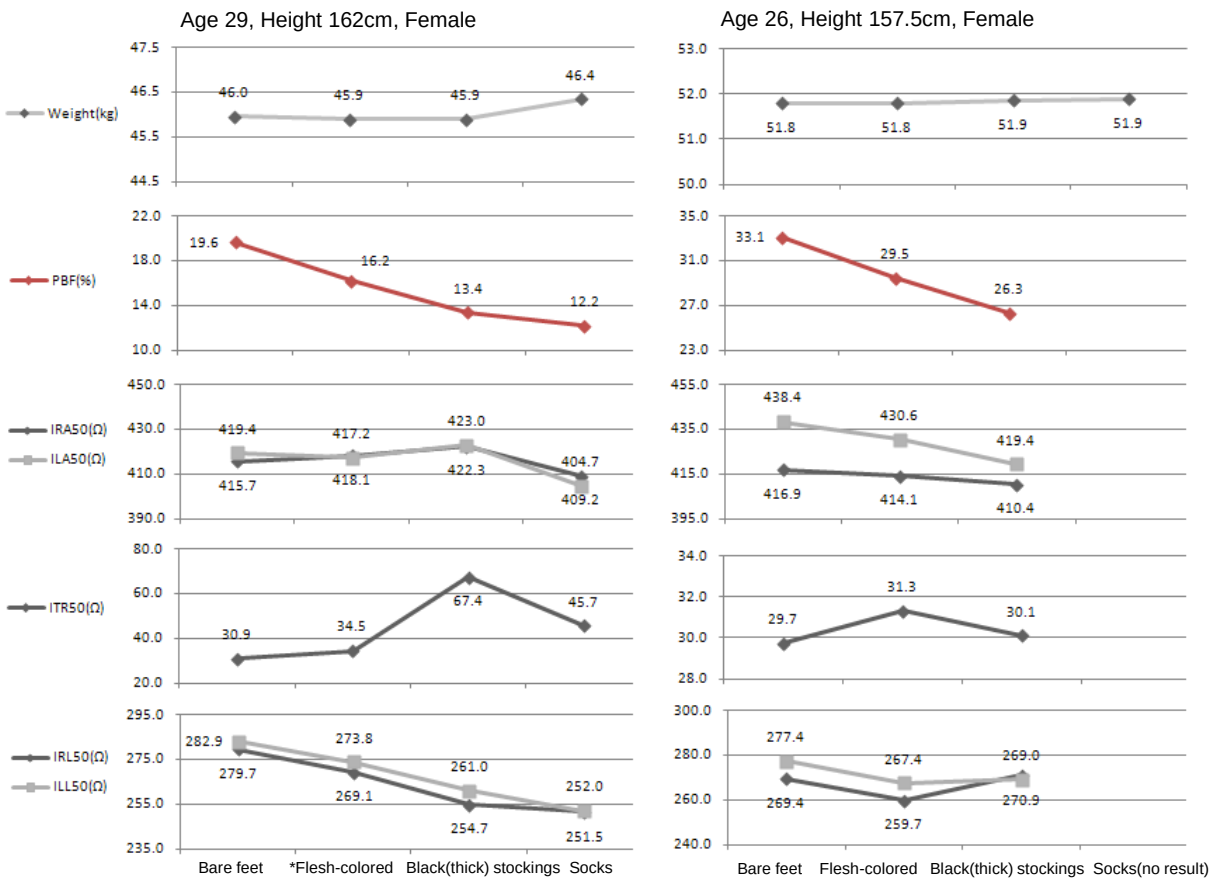
According to the result of the InBody measurement carried out on 4 participants (M=2, F=2) in their 20s and 30s who were wearing socks (both male and female) and 2 different types of stockings (females), trunk impedance increased by 0.4Ω ~ 65.7Ω and leg impedance decreased by 3Ω ~ 47.9Ω when compared with the measurements that were carried out in bare feet, which caused a 0.3% ~ 6.8% error in percent body fat. The InBody measurement must therefore be carried out bare feet in order to obtain an accurate measurement.

▲ Correct measurement(O) : Bare feet



▲ Incorrect measurement (X) : Wearing stockings or socks

<Changes in PBF(%) caused by wearing stockings or socks>



*Flesh-colored : general-purpose stockings

1) Kichul Cha, The principle of Bioelectricity Impedance Kichul Cha

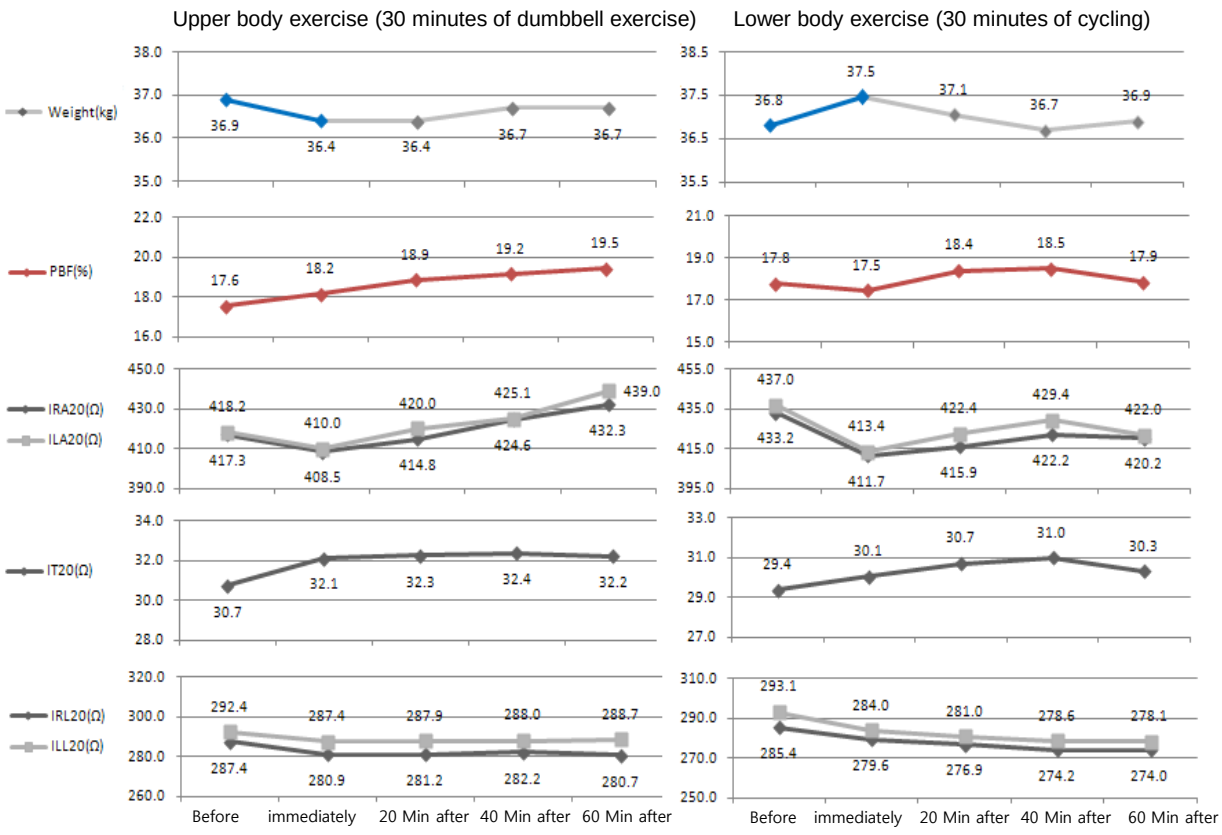
4. Perform the InBody measurement prior to physical exercises.

During physical exercise, a large amount of water is concentrated to the exercised area of the body to quickly supply nutrients and remove waste products. Soreness in the exercised area of the body after physical exercise indicates a high concentration of water in the area, and changes in the distribution of total body water results in errors in measurements made by BIA technology.

A paper published in 1993 contains the results of a test carried out on 30 male participants in their 20s, 30s and 40s. The whole body impedance of the participants was measured before exercise (walking on a treadmill at medium speed), 30 minutes after the exercise and 1 hour after the exercise. The measurements made immediately after the exercise showed a 1.3°C increase in skin temperature and a 15.6Ω decrease in impedance compared to measurements made before the exercise. However, after 1 hour of rest, both skin temperature and impedance returned to the state that it was before exercise.[1)] In general when temperature and blood flow increase, muscle resistivity decreases. In the process of emitting heat out of the body to lower body temperature that has risen during exercise, blood vessels expand and skin temperature and blood flow increase, which in turn lowers impedance.[2)]

A test was carried out on 5 adults in their 20s and 30s (M=2, F=3). When measured 30 minutes after upper and lower body exercise (dumbbell and cycling) at a medium level of intensity, impedance in the exercised areas of the body decreased while percent body fat fluctuated due to the influence of trunk impedance. When measured 1 hour after exercise, body skin temperature returned close to the temperature at rest, however, the percent body fat did not go back to the previous state. This indicates differences in individuals depending on their capacity to do the same exercise. When using BIA technology, impedance must be measured before exercise to minimize the range of error.

< Changes in PBF(%) of a 29 years old and 162cm tall female before and after physical exercise >



1) Liang MY, Norris S. Effects of skin blood flow and temperature on bioelectric impedance after exercise. *Med Sci Sports Exercise* 1993;25:1231-9.

2) Kushner RF, Gudivaka R, Schoeller DA. Clinical characteristics influencing bioelectrical impedance analysis measurement. *Am J Clin Nutr* 1996:64(suppl):423-427.

5. Perform the InBody measurement before taking a shower or bath.

Taking a shower or bath increases the rate of blood flow. It is a physiological effect to help maintain body temperature, and this affects the measurement of percent body fat.

According to a paper published in 1988, an increase in skin temperature resulted in a decrease in impedance, which in turn reduced the amount of body fat. To study the effect of skin temperature on impedance and percent body fat, the skin temperature of 8 healthy males' (in their 20s) extremities were measured and compared after exposing them to cool temperatures (14.4±1.61℃) and warm temperatures (35.0±3.03℃) for about 90 minutes. The result showed that after being exposed to warmer temperatures, the skin temperature was 9.3℃higher than when exposed to cooler temperatures while impedance and percent body fat decreased by 35Ω and 3% respectively.[1] Skin is first affected when taking a shower or bath. Entering into hot water during a bath temporarily increases body temperature. To emit heat from the body, blood vessels expand to increase blood flow rate, which causes a thermal effect which promotes blood circulation, increases skin temperature and reddens skin color.[2][3] The higher the water temperature, the faster the blood circulation and metabolism will become.[3]

However, when stepping into a cooler place after a bath, the body tries to minimize heat loss by contracting the blood vessels and lowering blood flow in the skin. This lowers skin temperature and eventually restores equilibrium to the body temperature. All types of baths including a full bath, half baths and foot baths, induces physiological changes in blood pressure, pulse rate, body temperature, perspiration and skin temperature.[3]

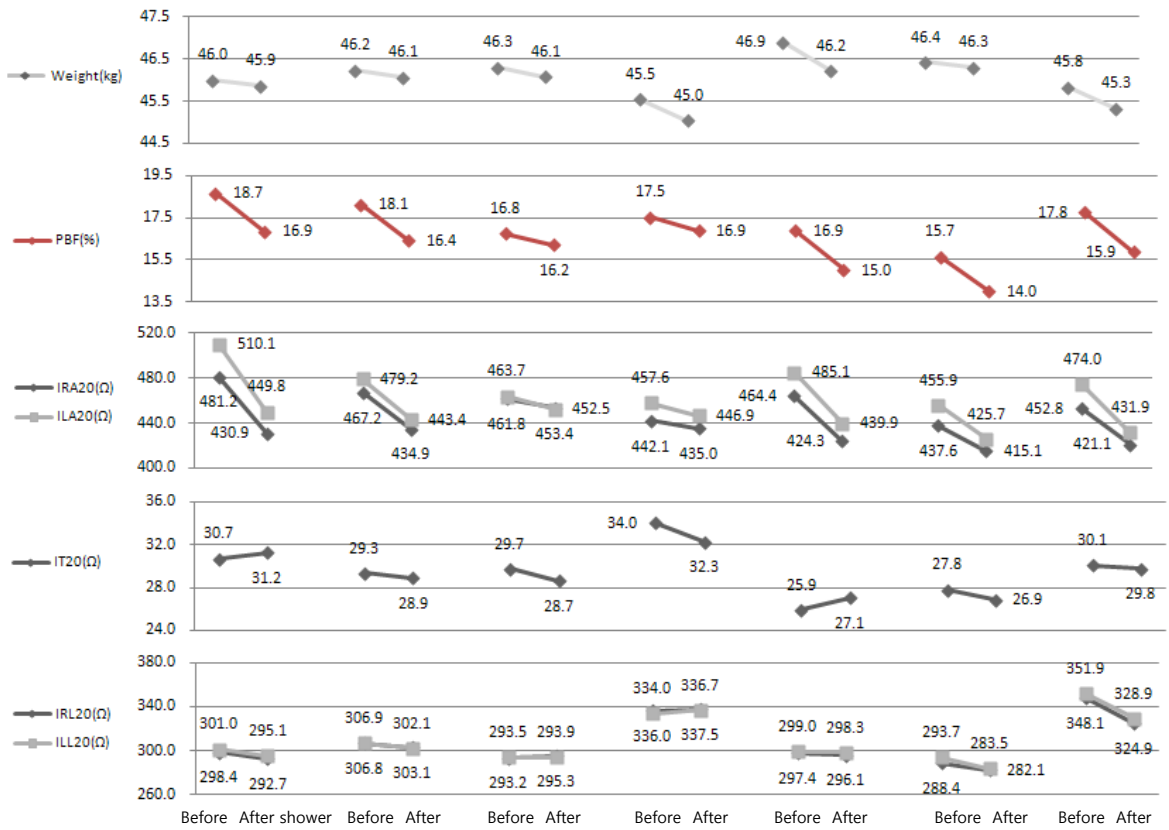
Therefore, even a light shower must be avoided before the InBody measurement. The InBody measurement must be carried out before taking a shower or bath to obtain an accurate body composition measurement.

When the InBody measurement were carried out on a 27 year old female before and after a 15-minute shower for a period of 7 days, the results showed a reduction in both body weight and percent body fat after a shower by 0.1kg ~ 0.7kg and 0.5% ~ 1.9% respectively.

TABLE 1. Determination of resistance and estimation of body composition by bioelectrical impedance analysis.

Condition	Resistance (Ω)	Body Water (l)	Fat Mass (kg)	% Fat	Lean Mass (kg)
Cool					
Mean	461	47.4	11.0	14.4	64.5
±SD	48	5.5	3.4	2.7	7.9
Warm					
Mean	426	49.9	8.8	11.4	66.7
±SD	47	5.6	3.1	2.6	8.2
Paired *t*	10.13	3.88	9.22	9.90	9.22
P value	<0.01	<0.01	<0.01	<0.01	<0.01

< Changes in PBF(%) of a 29 year old and 162 cm tall female before and after shower >



1) Caton JR., Mole PA, Adams WC, Heustis DS, Body Composition Analysis by bioelectrical impedance: effect of skin temperature. *Medicine and science in sports and exercise*, 1988

2) Jun TW, Jang CH, Jung DJ, The Difference of the Sweat Rate and Skin Temperature according to Environments during Submaximal Exercise, *Seoul National University Sports Science Research Center Paper* 15, No.1: 13~20, 1994.

3) Lee MR, The Effect on Bath-Therapy for Health Promition by Physiological Index and Health Behavior of User, *Koshin University Department of Health Science Doctorate Paper,* 2007 .

6. Perform the InBody measurement at room temperature to prevent changes in body temperature.

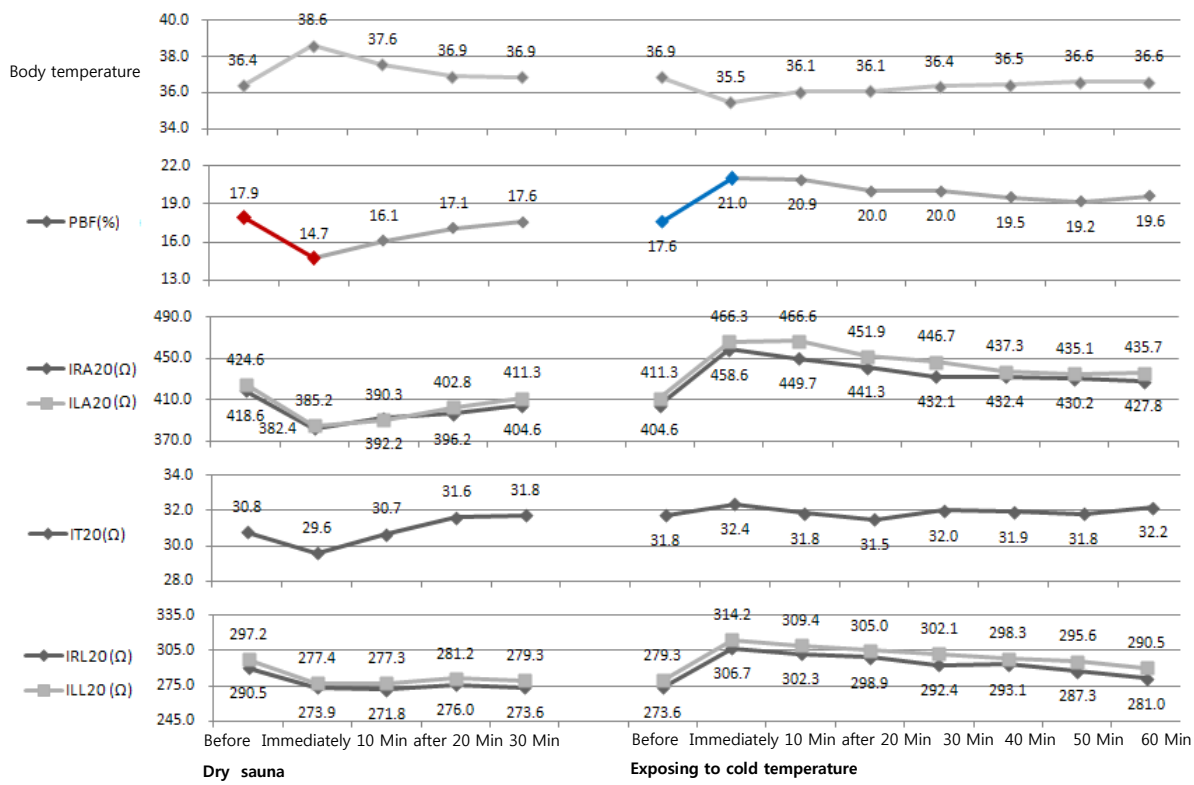
When we are exposed to hot or cold temperatures, our body responds by changing body temperature, skin temperature and blood flow. Body composition analyzers including the InBody use BIA technology to measure impedance and the measurement influenced by skin temperature and the temperature of the room.[1)2)3)]Therefore changes in body temperature and skin temperature in response to changes in the external environment affects impedance, which then results in errors of percent body fat measurements.

A paper published in 1988, included results from a test carried out on 8 healthy males (in their 20s). The subjects were exposed to cool temperature (14.4 ± 1.61 ℃) and warmer temperature (35.0±3.03℃) for about 90 minutes, and then changes in impedance and percent body fat in relation to the skin temperature of their extremities were measured. The results showed that after being exposed to warmer temperature the skin temperature was 9.3℃ higher than when exposed to cooler temperature while impedance and percent body fat decreased by 35 Ω and 3% respectively.[2)]

Generally temperature and impedance respond in opposite ways, and a decrease in body temperature brings an increase in impedance, which results in a lower amount of fat free mass.[3)] Our body tries to maintain a constant body temperature, and therefore, changes in body temperature due to the changes in the temperature of the external environment results in changes in skin temperature and expansion or contraction of blood vessels in the skin in order to restore equilibrium between heat generation and heat emission. Temperature of external environments (environments in which measurements were carried out) affects body temperature, skin temperature and blood flow, which in turn influences impedance, therefore, the InBody measurement must be carried out at room temperature of 25~30℃ to obtain an accurate result.[3)]

When the InBody measurement were carried out on 5 adults in their 20s (M=2, F=3) after exposing them to a hot environment (dry sauna) for 30 minutes and a cold environment (icy-cold room) for 30 minutes, the results showed an average 1.7°C increase in body temperature and a 1.7% ~ 3.2% reduction in percent body fat after being exposed to the hot environment. The results also showed that body temperature decreased by an average of 1.1°C while percent body fat increased by 1.3% ~ 4.2% after being exposed to a cold environment. Body temperature returned to normal after 30 minutes of being exposed to the above environments, however, percent body fat did not return to a stable state even 1 hour after being exposed to the cold environment.

< Changes in PBF(%) of a 29 years old and 162cm tall female after being exposed to a hot and cold environments for 30 minutes >



1) Buono MJ, Burke S, Endemann S, Graham H, Gressard C, Griswold L, Michalewicz B. The effect of ambient air temperature on whole-body bioelectrical impedance. *Physiol Meas*. 2004 Feb;25(1):119-23.

2) Caton JR., Mole PA, Adams WC, Heustis DS, Body Composition Analysis by bioelectrical impedance: effect of skin temperature. *Medicine and science in sports and exercise*, 1988

3) LIANG M.TC, SU HF, LEE NY, Skin temperature and skin blood flow affect bioelectric impedance study of female fat-free mass. *Med. Sci. Sports Exerc*. 2000;32:221-227.

7. Do not eat or drink before the InBody measurement.

Ingesting food increases body weight, and is therefore known to increase percent body fat following the principle of bioelectrical impedance analysis. However, in truth ingesting food decreases impedance and can lower percent body fat.

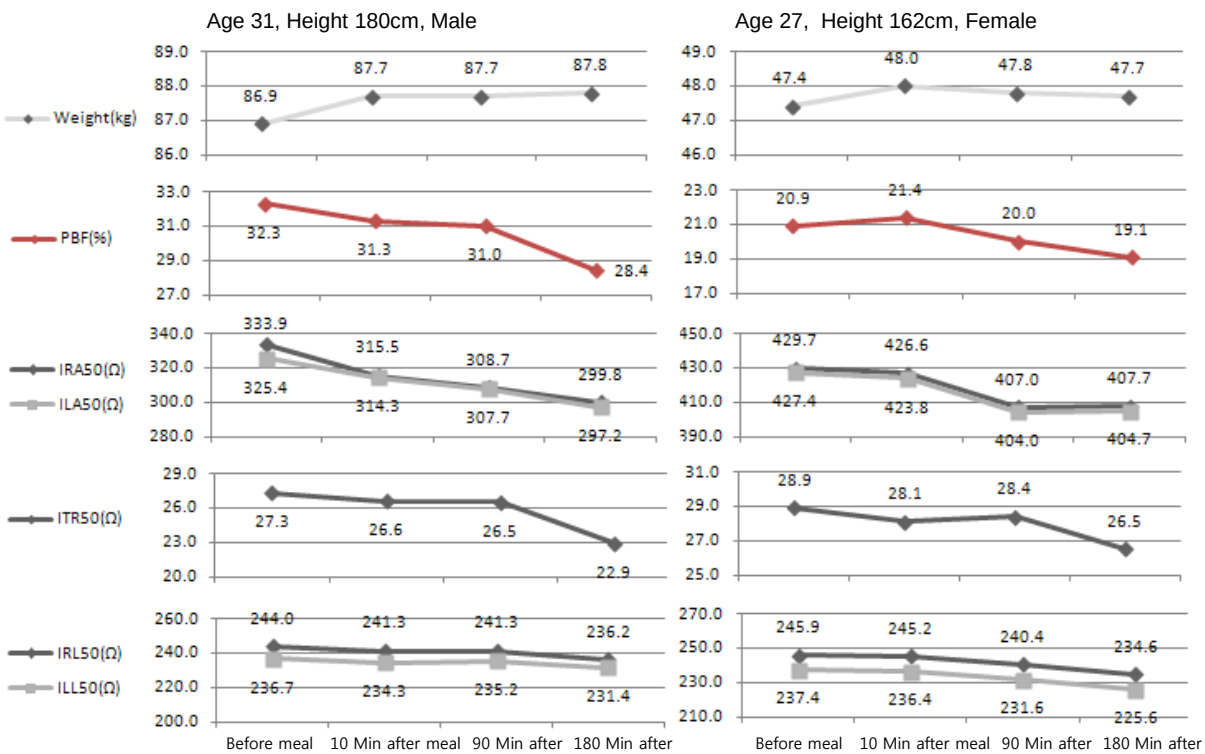
According to the paper published in 2001, impedance decreases greatly after ingesting food.[1] Impedance was measured 18 times from 8 males and 10 females (age bracket of 31.5±11.7), who ate the same breakfast, lunch and dinner. The results showed a big decrease in impedance when measured 2~4 hours after breakfast and further decreased after lunch and dinner, however, the initial impedance value returned the next morning. The daily average impedance of the females changed within the range of 602Ω±51Ω and the average impedance of the males changed with the range of 513Ω ±40Ω, which resulted in up to 8.8% difference in percent body fat for the females and up to 9.9% differences for males.

Another paper reported that changes in impedance after ingesting food depended on the type of food. For liquid meals, normal tea did not affect impedance, but the difference in electrolytes after ingesting beef broth resulted in greatly reduced impedance.[2][3]

After ingesting food, changes in fluid and electrolytes occur during digestion.[2][3] As there is a big increase in blood supply to the digestive system to promote movement of digestive organs, enzyme secretion and absorption of nutrients, blood flow increases greatly and then returns to normal in 2 hours.[4] This indicates that changes in body impedance is related to ingestion and digestion of food. Therefore, the InBody measurement must be carried out on an empty stomach to obtain an accurate body composition measurement.

Changes in the percent body fat of a female in her 20s and a male in his 30s were measured after dinner, and the results showed that percent body fat continuously decreased for 3 hours after the meal. In addition, changes in impedance after meal were measured on 5 adults in their 20s (M=3, F=2) for a day. The results showed a great reduction in torso impedance after breakfast, lunch and dinner, however, percent body fat measurements fluctuated and did not show a consistent pattern of changes.

<Changes in PBF(%) after ingesting food>



1) Slinde F, Hulthen LR, Bioelectrical impedance: effect of 3 identical meals on diurnal impedance variation and calculation of body composition. *Am J Clin Nutr* 2001;74:474-8

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3) Gallagher M, Walkier KZ, O'Dea K. The influence of a breakfast meal on the assessment of body composition using bioelectrical impedance. *Eur J Clin Nutr* 1998;52:94-7.

4) GUYTON & HALL'S TEXTBOOK OF MEDICAL PHYSIOLOGY, 12TH EDITION

8. Go to the bathroom before the InBody measurement.

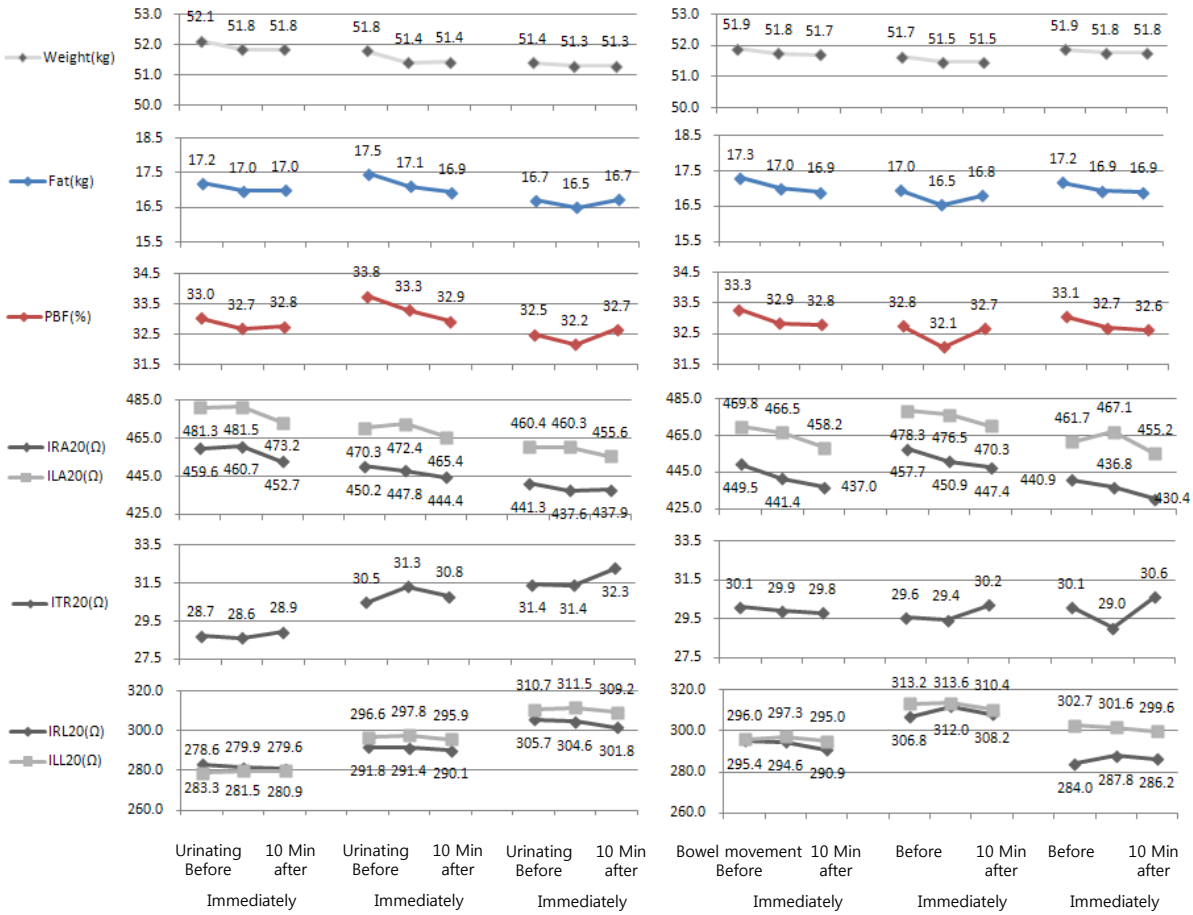
Body composition analyzers including the InBody use BIA technology to analyze body composition. Body composition can be divided into 2 groups: fat free mass and fat mass[1]. BIA principle calculates fat mass by deducting fat free mass from body weight which is the total body composition.

Ingesting food (meals and other food), clothing and faeces/urine within our body affect our body weight. Clothing and faeces/urine within the body do not affect impedance, and are considered as fat mass as electricity does not flow through them according to the BIA principle. Therefore, if the InBody measurement are carried out without removing these elements, they will be different from measurements carried out after removing them.

Generally it is known that percent body fat decreases after removing them according to the BIA principle. An actual test was carried out on 3 females in their 20s by measuring percent body fat before and after going to toilet and 10 minutes after going to toilet. The results showed that when measured immediately after going to the toilet, percent body fat decreased as the reduced amount of body weight was used as the amount of fat mass, while the measurements made 10 minutes or longer after going to toilet fluctuated and did not show a consistent pattern of changes.

As body weight is an important variable according to the BIA principle, it is best to carry out the InBody measurement after going to toilet if necessary.

< Changes in PBF(%) of a 26 year old, 157.5cm tall female before and after going to toilet >



1) Wang ZM, Pierson RN Jr, Heymsfield SB. The five-level model: a new approach to organizing body-composition research. *Am J Clin Nutr*. 1992;56:19-28.

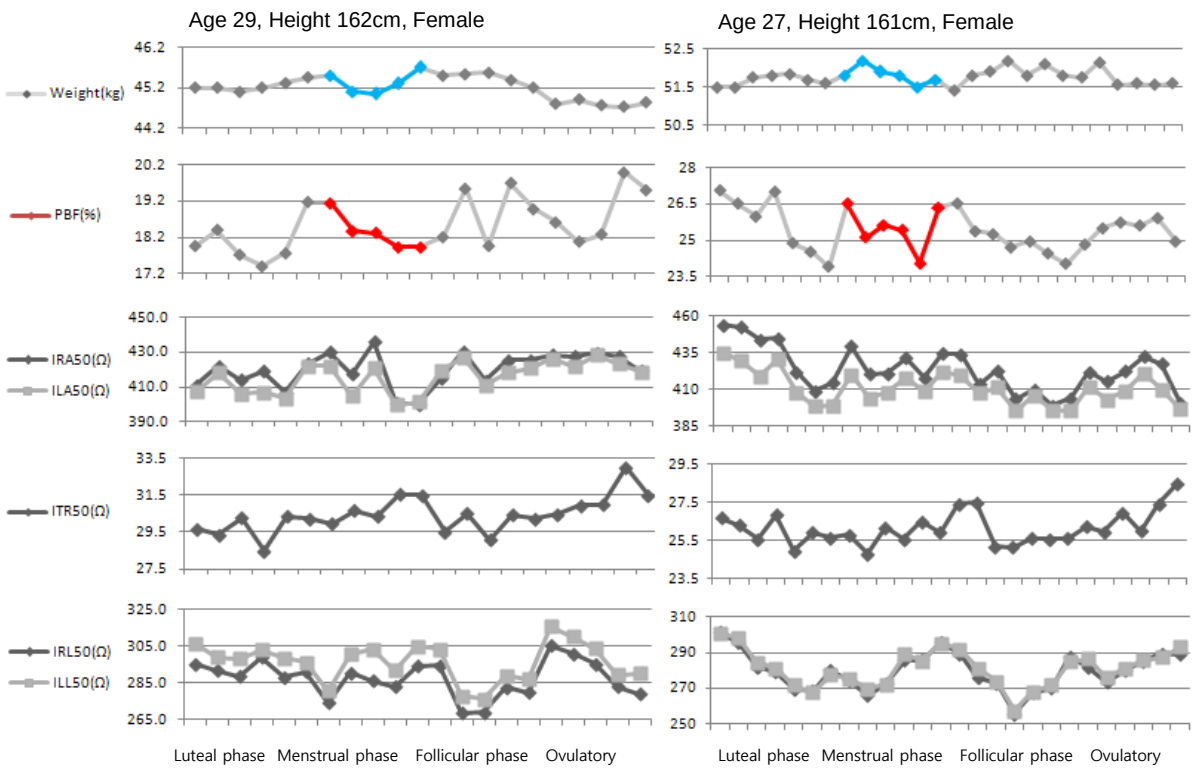
9. Avoid the InBody measurement during menstruation.

Menstrual cycles can cause temporary changes in body weight and body composition due to hormonal influences. Generally, women's body weight increases during the luteal phase due to the accumulation of total body water.[1] This is caused by an increase in the level of progesterone which is at its highest immediately before menstruation.[2] Accumulation of total body water during the luteal Phase or menstrual phase results in an increase of fat free mass and a decrease in percent body fat. However, an increase in appetite and changes in diet pattern due to the tendency to crave sweet or salty food during the luteal phase[3] may cause an accumulation of fat mass, which in turn increases percent body fat.

A paper published in 2005 contained results of tests carried out on 24 females in their 20s and 30s (12 Pre-menstrual syndrome sufferers and 12 non sufferers) for 4 weeks. The test measured the effect of menstrual cycles and the amount of food ingestion on body composition. The results showed that more changes occurs in body weight, total body water, fat mass and the amount of food ingestion during the luteal and menstrual phases than during the follicular phase regardless of experiencing pre-menstrual syndrome.[4]

A test was carried out on 2 females in their 20s to observe the effect of menstrual cycle on body composition during 3 months of periods. The results showed that percent body fat fluctuated during the luteal and menstrual phases and the measurements varied from month to month even for the same person. In some cases, less changes in percent body fat occurred during the luteal and menstrual phases, which demonstrated the fact that the effect of menstrual cycles on body composition differs depending on individuals. As physical changes during the menstrual cycle vary from person to person, its effect on body composition cannot be accurately predicted. However, the biggest changes in body composition occur during the luteal and menstrual phases, and therefore it is the best that females avoid the InBody measurement during these phases.

< Changes in PBF(%) during menstrual cycle >



1) Gleichauf CN, Reo DA, The menstrual cycle's effect on the reliability of bioimpedance measurement for assessing body composition, *Am J Clin Nutr* 1989;50: 903-907.
2) Lusseveld EM, Peters ET, Deurenberg P, Multifrequency bioelectrical impedance as a measure of differences in body water distribution, *Ann Nutr Metab.* 1993;37(1):44-51.
3) Parlee MB, Stereotypic beliefs about menstruation, a methodological note on the moos menstrual distress questionnaire and new data. *Psychosomatic Medicine* 1974;36:229-240.
4) Jang EJ, Kim DG et at. The effect of premenstrual syndrome on the changes in the amount of food ingestion and body composition, *J korean Soc Food Sci Nutr* 2005;34(2), 190~195.

10. Why changes in body weight and height alter body composition measurements.

Body composition analyzers including the InBody use BIA technology to analyze body composition.

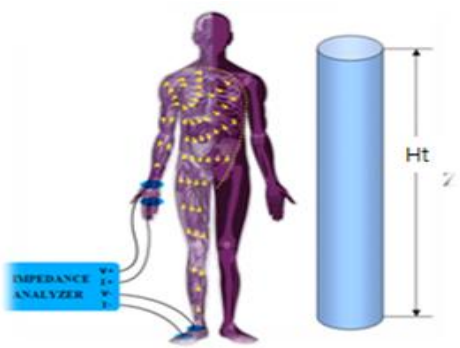
BIA (Bioelectrical Impedance Analysis) measures impedance within the body by running a weak current through the body, and calculates the volume of total body water by measuring impedance within the body and using an impedance index as total body water conducts current.[1)2)]

Impedance Index (=L^2/R) can be obtained by dividing height squared by resistance. L is height of the measuring subject and R is the measured resistance, therefore the volume of total body water can be calculated using subject height and resistance value.[1)2)] As shown in the formula, subject height is proportional to the volume of total body water, therefore an increase in height leads to an increase in the volume of total body water. Total body water is proportional to fat free mass, which results in reduced fat mass. Body composition can be divided into 2 groups: fat free mass and fat mass,[3)] and fat mass can be calculated by deducting fat free mass from body weight which is the total body composition. This means that an increase in body weight while maintaining the same fat free mass results in increased fat mass.

According to a paper published in 1992, a height difference of 2.5cm resulted in an error margin of 1ℓ in TBW, and a weight difference of 1kg resulted in an error margin of 0.2ℓ in TBW and 0.7kg in fat mass.[2)4)]

Height and body weight are very important variables in BIA principles. Inputting incorrect heights or measuring body weight without taking into account clothing or food ingestion results in errors in fat mass measurements.

Therefore, the InBody measurement must be carried out on an empty stomach and in the lightest possible clothing in order to obtain accurate results. For repeated measurements, make sure to input the same height.



$$Impedance\ \ Index = c\frac{Height^2}{Impedance}$$

$$Total\ Body\ Water \propto a\frac{Height^2}{Impedance} + b$$

<The effect of changes in height/body weight on changes in PBF(%) of a 29 year old, 162cm tall female>

		Changes in height				Changes in body weight		
Items	**Standard**	-2cm Decrease	+1cm Increase	+3cm Increase	**Standard**	-2kg Decrease	+1kg Increase	+3kg Increase
Height(cm)	**162**	160	163	165	**162**	162	162	162
Weight(kg)	**44.4**	44.3	44.3	44.3	**46.4**	44.4	47.4	49.4
SLM(kg)	**34.3**	33.8	35	35.8	**34.8**	34.3	35.1	35.2
Body Fat(kg)	**8.1**	8.5	7.2	6.4	**9.5**	8.1	10.2	11.9
PBF(%)	**18.2**	**19.1**	**16.3**	**14.4**	**20.4**	**18.2**	**21.5**	**24.1**

1) Kushner RF, MD, FACN, Bioelectrical Impedance Analysis: A Review of principles and applications, *Am J Clin Nutr* 1992;11:199-209.
2) Kushner RF, Schoeller DA, Fjeld CR, Danford L, Is the impedance index(ht^2/R) significant in prediction total body water? *Am J Clin Nutr* 1992;56:835.
3) Wang ZM, Pierson RN Jr, Heymsfield SB. The five-level model: a new approach to organizing body-composition research. *Am J Clin Nutr*. 1992;56:19-28.
4) Kushner RF, Clinical characteristics influencing bioelectrical impedance analysis measurements. *Am J Clin Nutr* 1996:64(suppl):423S-7S.

11. Why percent body fat varies before and after sleep?

The reason that percent body fat measurements differ before and after sleep is because changes occur in the distribution of total body water while sleeping for an average of 6~7 hours. Sleeping and waking up brings about changes in posture, which makes water in our body move.

In a lying down position, blood moves from the extremities to the trunk, and changes occur in impedance regardless of any changes in total body water (TBW).[1)]

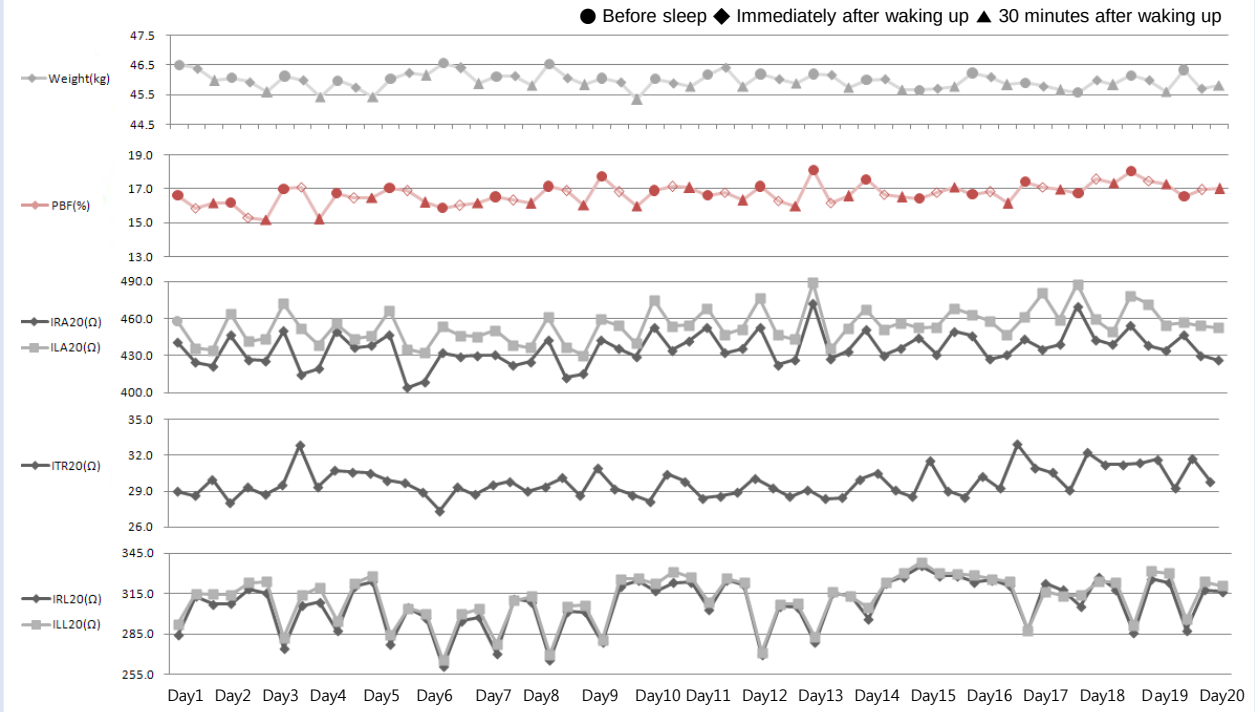
A paper published in 2003 includes a test carried out on 10 healthy males and 8 healthy females, all in their 20s. Changes in impedance were measured 16 times while the subjects were lying down for 12 hours, and the results showed 64Ω increased impedance compared to the initial impedance measurement.[3)] The longer the subjects stayed laying down, the greater the changes became.[2)3)4)]

When standing up, redistribution of total body water occurred as blood moved to the lower part of the body due to gravity and blood (venous return) flow into the heart decreased, which in turn reduced the total impedance.[1)4)] Changes in impedance due to posture changes remain for at least 15 minutes from the moment posture changes, and the longer the same posture is maintained, the longer it takes to return to a stable distribution of total body water.[1)] Average sleeping time is 6~7 hours, therefore, it takes a while to stabilize the distribution of total body water after waking up. Therefore, avoid carrying out the InBody measurement immediately after waking up and the InBody measurement must be carried out on an empty stomach in the morning to obtain an accurate result.

The body composition of a 27 year old female was measured before sleep, immediately after waking up, 30 minutes after waking up (water intake, discharging urine) for 20 days. The results showed that the maximum changes in body weight and percent body fat before sleep and after waking up were 0.8kg and 1.8% respectively. Generally body weight was lighter after waking up compared to before sleep; however, percent body fat fluctuated and did not show a consistent pattern.

<Changes in PBF(%) of a 27 year old, 162cm tall female before sleep, immediately after waking up and 30 minutes after getting up, measured for 20 days>

Before sleep → after waking up, maximum changes in body weight change: 0.8kg, maximum changes in PBF 1.8%



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InBody