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KvL/P&Z/2007.042

Een instrument voor het bepalen van ondergewicht, overgewicht en obesitas

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Inhoudsopgave

1 Inleiding

1.1 Achtergrond

Overgewicht onder kinderen is een sterk groeiend probleem. Indien een kind eenmaal te dik is, dan is de kans zeer groot dat het kind ook later als volwassene overgewicht zal hebben. Overgewicht draagt bij aan de ontwikkeling van chronische ziekten zoals diabetes en hart- en vaatziekten. Kinderen die nu geboren worden dreigen daardoor minder oud te worden dan hun ouders.

Overgewicht wordt vastgesteld aan de hand van de Body Mass Index (BMI). De BMI wordt uitgerekend uit de lengte en gewicht van het kind als BMI = kg/m2. De berekende waarde wordt vergeleken met grenswaarden die afhankelijk zijn van de leeftijd. In de praktijk worden in de berekening veel fouten gemaakt. Ook het vergelijken met de grenswaarde levert soms problemen op. Hierdoor worden kinderen met overgewicht mogelijk onvoldoende opgespoord en behandeld.

In 2004 heeft TNO samen met het voormalige Kenniscentrum Eetstoornissen Nederland de BMI-meter ontwikkeld. De BMI-meter is een ronde, geplastificeerde kaart met twee draaischijven. Appendix 1 bevat een weergave van het ontwerp uit 2004. Op de ene kant van de BMI-meter kan de gebruiker eenvoudig de BMI berekenen uit lengte en gewicht door de lengte op het juiste gewicht te plaatsen. Het resultaat kan dan in een apart venster worden afgelezen. De andere kant van de BMI-meter vermeldt de leeftijdsspecifieke grenswaarden. Door de berekende BMI waarde te vergelijken met de leeftijdsafhankelijke tabel kan een kind worden ingedeeld in een van de volgende groepen: ernstig ondergewicht, ondergewicht, normaal, overgewicht, obesitas. De afkapwaarden van ernstig ondergewicht en ondergewicht zijn ontleend aan Van Buuren (2004). De afkapwaarden voor overgewicht en obesitas corresponderen met de internationale IOTF waarden (Cole et al, 2000). Sinds 2004 zijn ongeveer 3500 exemplaren van de BMI-meter verspreid onder zijn in 2004 onder diverse beroepsgroepen in de zorg. Zie http://www.eetstoornis.info/ voor meer informatie.

De BMI-meter is een handig instrument, voorkomt fouten in de diagnostiek en behandeling van overgewicht, maar is helaas niet geschikt voor het gebruik bij kinderen jonger dan 12 jaar. De BMI berekening werkt pas vanaf een lengte van 140 cm en een gewicht van 35 kg.

1.2 Doel

Het doel van dit project is het ontwerp van de BMI-meter aan te passen zodanig dat deze geschikt wordt voor kinderen vanaf 2 jaar. Voor leeftijden 0-2 jaar is het niet gebruikelijk om de BMI te gebruiken. Het tweede doel is de nieuwe BMI-meter te verspreiden onder de doelgroep: huisartsen, kinderartsen, internisten, verpleegkundigen, etc.

1.3 Opzet

Het ontwerp van de huidige BMI-meter zal worden aangepast zodanig dat deze ook zal werken voor kinderen vanaf 2 jaar Vervolgens zal een proefmodel gemaakt worden dat

aan potentiële gebruikers wordt voorgelegd. Op basis van de ervaringen van deze gebruikers wordt een definitief ontwerp gemaakt. Dit ontwerp zal worden gedrukt in een eerste oplage van 1500 stuks. De eerste oplage van de BMI-meter zal gratis worden verspreid onder de doelgroep: professionals in de JGZ en de kindergeneeskunde. Op de BMI-meter wordt vermeld dat deze tot stand is gekomen met financiële ondersteuning van het Loosco fonds.

De planning van het project was als volgt:

Maand 1-3	Ontwerp van de nieuwe BMI-meter
	Ontwikkeling korte evaluatielijst
	Productie van prototype
Maand 4-6	Gebruikersevaluatie van prototype
Maand 7-8	Maken definitief ontwerp
	Verzamelen adresgegevens
Maand 9-10	Productie BMI-meter
Maand 11-12	Verzending
	Rapportage van de projectresultaten aan Loosco fonds

2 Uitvoering

2.1 Voortgang

Het project is gestart op 1 juni 2006. In de eerste drie maanden is een eerste ontwerp gemaakt waarbij de schalen voor lengte en gewicht werden opgerekt. Dit ontwerp is voorgelegd aan enkele TNO medewerkers die tot de potentiële gebruikersgroep behoren. Hierbij is gevraagd naar gebruikersgemak, bruikbaarheid, leesbaarheid, degelijkheid, en het formaat van het ontwerp. Naar aanleiding van deze opmerkingen is het ontwerp aangepast. Opgemerkt werd dat het voor de praktijk ook nuttig zou zijn indien het instrument de categorie obesitas (BMI>30 op 18 jaar) verder zou kunnen uitsplitsen naar drie categorieën (BMI>30, BMI>35 en BMI>40 op 18 jaar). Om aan deze wens tegemoet te komen is besloten deze categorieën toe te voegen. Aangezien er voor kinderen geen criteria zijn voor de twee meest extreme categorieën is op basis van gegevens van de Derde Landelijke Groeistudie en de Vierde Landelijke Groeistudie nieuwe criteria ontwikkeld. De nieuwe criteria zijn op het instrument aangebracht. Daarnaast bleek het mogelijk het eerdere ontwerp aanzienlijk te vereenvoudigen door alle functies naar één kant te brengen.

Het uiteindelijke ontwerp (Appendix 2) is geavanceerder dan de aanvankelijk voorziene uitbreiding van de lengte- en gewichtassen. Het nieuwe ontwerp werkt volgens een nieuw principe. Na overleg met de TNO patent office is daarom besloten octrooi op het ontwerp aan te vragen. In verband met de nieuwheidvinding zijn op aandringen van de TNO patent office alle contacten tijdelijk bevroren. Eind januari 2007 is de patentaanvraag (Appendix 3) ingediend.

In de tussenrapportage werd het congres Volkgezondheidscongres (11-12 april 2007) genoemd om het instrument te presenteren. Door de wens van twee extra categorieën voor obesitas en door het schrijven en wachten op het octrooi is de uitvoering van het tweede deel van het project enigszins in het gedrang geraakt. Momenteel wordt i.s.m. de Robert Fleury Stichting in Leidschendam gewerkt aan het productierijp maken van de nieuwe BMI-meter. Op de achterkant van het instrument komt een korte gebruikersinstructie, een tabel met gebruikte afkapwaarden, en een vermelding dat dit ontwerp tot stand is gekomen met steun van het Loosco fonds. Naar verwachting zal deze voor de zomer gereed zijn, en klaar voor verzending.

Intussen zijn ook oriënterende contacten gelegd met het Kenniscentrum Overgewicht, de World Health Organization, en het Ministerie van VWS. Er bestaat interesse voor het instrument, maar in dit stadium is het nog te vroeg voor verdere afspraken. De komende maanden zullen gebruikt worden om te peilen of de interesse omgezet kan worden in concrete opdrachten voor de productie van een aangepaste BMI-meter.

2.2 Het nieuwe instrument

In het nieuwe instrument is gekozen voor de volgende indeling in BMI-klassen voor volwassenen:

Tabel 1 NIH/WHO classificatie van Body Mass Index (BMI) voor volwassenen met risicolabels gebaseerd op Katzmarzyk et al, 2000 [4]. Obesity = Obesity I + Obesity II + Obesity III. Severe Obesity = Obesity II + Obesity III.

Classification	BMI (kg/m2)	Risk on co-morbidity (Katzmarzyk et al, 2000)
Severe underweight	BMI < 17,0	Low (but increased risk for other clinical problems)
Underweight	17,0 ≤ BMI < 18,5	Low (but increased risk for other clinical problems)
Normal weight	18,5 ≤ BMI < 25,0	Average
Overweight	25,0 ≤ BMI < 30,0	Increased
Obesity I	30,0 ≤ BMI < 35,0	Moderate
Obesity II	35,0 ≤ BMI < 40,0	Severe
Obesity III	BMI ≥ 40,0	Very severe

Voor kinderen zijn leeftijdsafhankelijke afkapwaarden nodig. Voor (ernstig) ondergewicht zijn deze ontleend aan Van Buuren (2004). Voor overgewicht en obesitas zijn de IOTF-waarden gebruikt (Cole et al, 2000). Voor obesity II en obesity III zijn nieuwe afkapwaarden ontwikkeld op basis van gegevens van de Derde en Vierde Landelijke Groeistudie.

Het ontwerp verbetert bestaande BMI-meters op de volgende aspecten:
1. de lengte loopt van 75cm tot 210cm. Dit is voldoende voor kinderen vanaf 2 jaar;
2. de gewichtschaal is eeuwigdurend (in de praktijk loopt de schaal van 10kg-200kg);
3. de BMI wordt op dezelfde schaal afgelezen als het gewicht. Dit is een uniek aspect aan dit ontwerp;
4. de afkapwaarden zijn van leeftijdafhankelijk (2-18 jaar). Gebruikelijk was de vaste afkapwaarden voor volwassenen;
5. de overgewicht klasse van een kind kan direct afgelezen worden zonder de BMI-waarde uit te rekenen. Dit is een uniek aspect van dit ontwerp;
6. De leeftijdsas loopt langs de straal van de cirkel. Dit is een uniek aspect van deze vinding.

De witte delen in het ontwerp in Appendix 2 zijn in de productieversie transparant.

Door dit ontwerp kan in de praktijk een stap worden overgeslagen. Het is niet meer nodig de BMI zelf te berekenen en te onthouden, en de waarde met de tabel te vergelijken. In plaats daarvan kan meteen de BMI-klasse worden afgelezen. Dit levert belangrijke tijdbesparing op. Overigens kan het aflezen van de BMI-waarde nog steeds, maar deze is niet meer nodig om de klasse te bepalen. Bovendien is de achterkant vrij voor andere doeleinden. Door het vervallen van de schijf is de productie goedkoper.

3 Conclusie

Het eerste doel van dit project betrof het geschikt maken van de bestaande BMI-meter voor kinderen. Deze doelstelling is gehaald. Het eindresultaat overtreft de oorspronkelijke doelstelling in de zin dat 1) een volledige stap uit de bepaling van overgewichtklasse valt, 2) er meer BMI-klassen worden onderscheiden, 3) de achterkant vrij is voor andere doeleinden, en 4) de productie goedkoper wordt.

Het tweede doel van het project was de nieuwe BMI-meter te verspreiden onder de doelgroep: huisartsen, kinderartsen, internisten, verpleegkundigen, etc. Deze doelstelling is nog niet gehaald. In de komende maanden wordt hieraan verder gewerkt.

4 Dankwoord

Dit project is mogelijk gemaakt door financiering van het Loosco fonds. We zijn het Loosco fonds erkentelijk voor het in ons gestelde vertrouwen.

5 Literatuur

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and obesity in the Canadian population using the WHO/NIH criteria. Obes Res. 2000;8:194-197.

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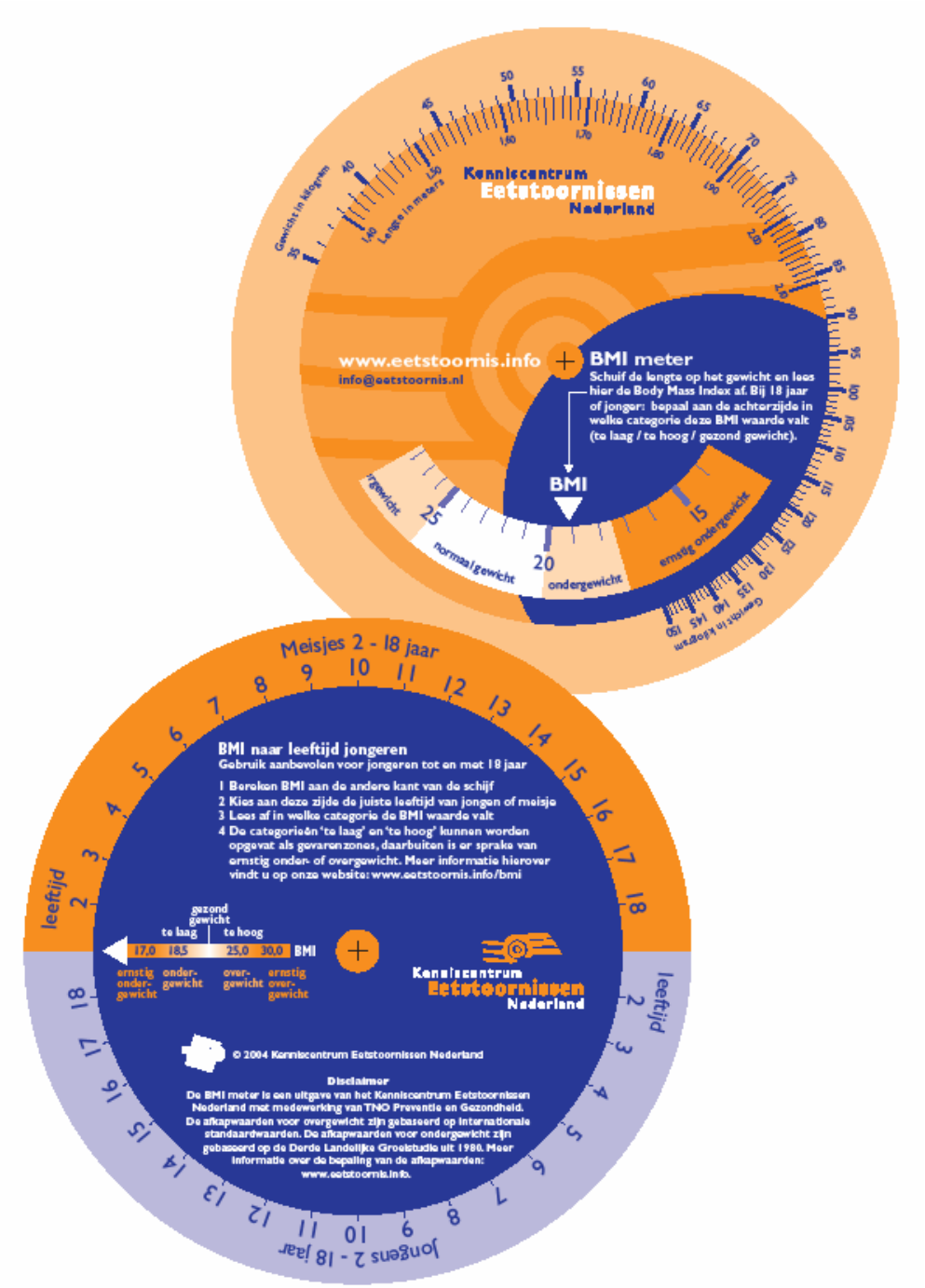
A Ontwerp van de BMI-meter uit 2004


Kenniscentrum
Eetstoornissen
Nederland
Gewicht in kilogram
Lengte in meters
www.eetstoornis.info
info@eetstoornis.nl
BMI meter
Schuif de lengte op het gewicht en lees hier de Body Mass Index af. Bij 18 jaar of jonger: bepaal aan de achterzijde in welke categorie deze BMI waarde valt (te laag / te hoog / gezond gewicht).
BMI
ernstig overgewicht
normaalgewicht
ondergewicht
ernstig ondergewicht
Gewicht in kilogram
Meisjes 2 - 18 jaar
leeftijd
BMI naar leeftijd jongeren
Gebruik aanbevolen voor jongeren tot en met 18 jaar
1 Bereken BMI aan de andere kant van de schijf
2 Kies aan deze zijde de juiste leeftijd van jongen of meisje
3 Lees af in welke categorie de BMI waarde valt
4 De categorieën 'te laag' en 'te hoog' kunnen worden opgevat als gevarenzones, daarbuiten is er sprake van ernstig onder- of overgewicht. Meer informatie hierover vindt u op onze website: www.eetstoornis.info/bmi
gezond gewicht
te laag
te hoog
17,0 18,5 25,0 30,0 BMI
ernstig onder-gewicht
onder-gewicht
over-gewicht
ernstig over-gewicht
Kenniscentrum
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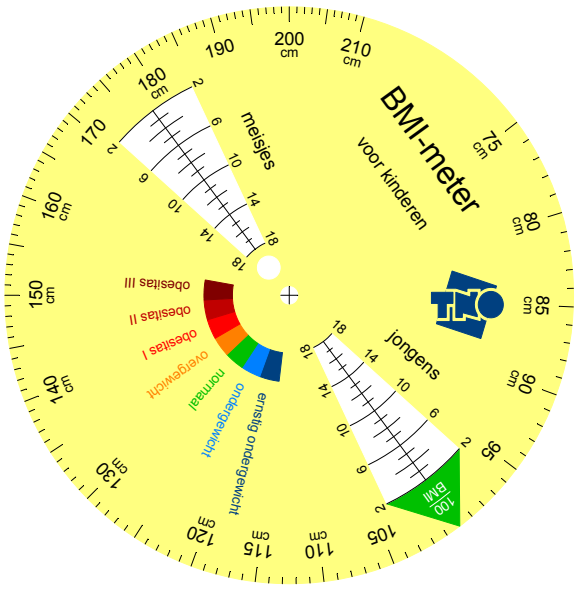
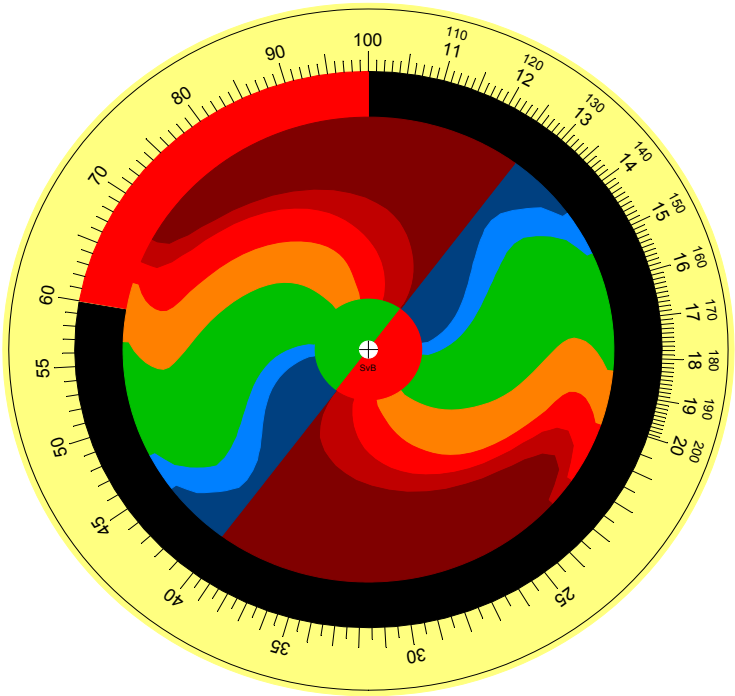
Disclaimer
De BMI meter is een uitgave van het Kenniscentrum Eetstoornissen Nederland met medewerking van TNO Preventie en Gezondheid. De afkapwaarden voor overgewicht zijn gebaseerd op internationale standaardwaarden. De afkapwaarden voor ondergewicht zijn gebaseerd op de Derde Landelijke Groeistudie uit 1980. Meer informatie over de bepaling van de afkapwaarden: www.eetstoornis.info.
leeftijd
Jongens 2 - 18 jaar

B Ontwerp van de nieuwe BMI-meter


BMI-meter
voor kinderen
meisjes
jongens
obesitas III
obesitas II
obesitas I
overgewicht
normaal
ondergewicht
ernstig ondergewicht
BMI
TNO


SvB

C Octrooiaanvraag

Age-Dependent Relative Weight Indications

The present invention relates to age-dependent relative weight indications. More in particular, the present invention relates to a device and method for providing a relative weight indication of a person based on the person's weight and height.

As the number of people having weight problems increases, it becomes more and more important to determine whether a person's weight is "normal". It is well known that a person's "normal" or desired weight strongly depends on his or her height. Accordingly, the Body Mass Index (BMI) has been developed to provide an indication of a person's weight relative to his or her height. The BMI and similar measures make it possible to determine relatively quickly whether a person is underweight, normal or overweight.

A BMI value is determined by dividing a person's weight (in kg) by the square of his or her height (in meters). A BMI value between 18.5 and 25 (kg/m^2) is considered normal, values above 25 (kg/m^2) are indicative of overweight, while values below 18.5 (kg/m^2) indicate underweight. In addition to the three classes underweight, normal and overweight, further BMI classes may be distinguished, such as obese I, obese II and obese III, all defined by certain boundary BMI values.

Typically, a person's BMI value is calculated with the aid of an electronic calculator. This calculation typically involves squaring the weight, storing the result, and then dividing the height by the stored result to obtain the BMI value. This calculated BMI value may then be compared with a list showing the boundary values of the various BMI classes. This known method of determining a person's BMI class (or, in general, relative weight class) is cumbersome and often leads to errors and incorrect results.

In order to facilitate the determination of a person's BMI value or similar value, several solutions have been proposed. For example, wheel calculators have been designed which allow a person's BMI to be determined by rotating a weight scale relative to a height scale and aligning a person's weight and height. As a result of this rotation, the person's BMI can be read off another scale.

United States Patent Application US 2006/0122470 discloses an Internet-based BMI meter. At the time of writing, this BMI meter was available on the Internet at www.sageera.com/bmi-article. A user's weight and height may be entered using the keyboard of a computer. The program then calculates the user's BMI and shows his or her weight on a weight scale. The pointer indicating the weight also indicates a weight

class (normal, overweight, obese I, …). In the Internet version, different weight classes have different colors to allow an easy class identification.

Although this known Internet-based BMI meter is convenient, it can only be used when a computer is available. Often there is a need for a simple, relatively inexpensive device which the user can carry in his or her pocket, such as a wheel calculator. This problem could be solved by designing a wheel calculator that corresponds with the Internet-based BMI meter of US 2006/0122470. However, the known BMI meter has another, more serious drawback, in that it is designed specifically for adults.

It has been found that overweight or obesity during childhood significantly increases both the probability of obesity during a person's adult life and the risks of health problems associated with overweight, such as heart and coronary diseases. There is, therefore, a need to monitor the weight of children. Conventional BMI scales, however, are designed for adults and are not applicable to children, as the ratio of body height and weight of children is different from that of adults.

United States Patent US 3 572 585 discloses a wheel calculator for determining the number of days a patient should diet. A patient's age, sex, weight, height and physical activity as well as the caloric value of a desired diet are used as input variables to determine the caloric deficit of the diet, and subsequently the number of days required for a desired weight loss. Operating this wheel calculator is complicated as it requires a large number of steps involving at least six different scales located on both the top face and the bottom face of the device. Consequently, only trained users will be able to use this known device without making errors. In addition, the age scales start at 5 years and therefore it is not possible to obtain readings for younger children using this known device. Furthermore, this known device does not provide a single value indicative of a person's relative weight, such as a BMI value.

It is an object of the present invention to overcome these and other problems of the Prior Art and to provide a device and a method for providing a relative weight indication of a person which are easy to use yet take the person's age into account.

Accordingly, the present invention provides a device for providing a relative weight indication of a person based on the person's weight and height, the device comprising:

- a first scale representing weight,
- a second scale representing height,
- a third scale representing the age of the person, and
- a fourth scale representing the relative weight indication,

wherein the second scale is moveable relative to the first scale such that the weight and the height of the person can be matched, and wherein one of the third scale and the fourth scale is coupled to the first scale and the other one of the third scale and the

fourth scale is coupled to the second scale, such that matching the weight and the height of the person allows the relative weight indication to be read from the fourth scale at the age indicated by the third scale.

By providing a third scale representing the age of the person, it is possible to take age into account when determining the person's relative weight indication. As a result, an age-adjusted relative weight indication can be used. This offers the significant advantage of being able to use the device for children or, preferably, for both adults and children.

By suitably coupling each of the third and fourth scales to one of the first and second scales, the step of aligning the person's weight and height automatically adjusts the third and fourth scales, such that the relative weight indication reading obtained from the fourth scale corresponds with the person's weight and height. As a result, the present invention provides a device which allows an age-adjusted relative weight indication to be obtained using only four scales and requiring only two operation steps:

1. aligning the weight and the height of the person,
2. reading the relative weight indication at the proper age.

In fact, the device of the present invention allows the relative weight class to be determined without having to determine the relative weight value, thus effectively skipping one operation step. Accordingly, the device of the present invention is very simple to operate and is suitable for a wide range of users.

Although a universal age scale can be used for children, it has been found that some relative age indications require adjustment according to sex. In a particularly advantageous embodiment of the device according to the present invention, therefore, the third scale and the fourth scale each comprise a first part and a second part, the respective first parts being adapted for males (boys) and the respective second parts being adapted for females (girls). Such two-part scales allow the correct readings to be made for both sexes. Of course it is possible to provide two-part scales for adults too, but in practice this is typically not necessary, as the relative weight indications for 18-year olds can typically also be used for adults.

In a preferred embodiment, the first scale, the second scale, the third scale and the fourth scale are all arranged on one face of the device. This allows the device to be used without turning it over, thus facilitating the handling of the device. In addition, arranging all scales on the same face of the device allows the other (or "blank") face to be used for other purposes, for example advertising and/or operating instructions.

Moving the first and second scales relative to each other may, in some instances, result in an incorrect reading, for example when the reading is "off scale". In order to avoid any erroneous readings, the device of the present invention may further comprise

a fifth and/or sixth scale indicative of a valid relative weight indication range and a marker allowing the range to be read from the said fifth and/or sixth scale, wherein one of the said scale and the marker is coupled to the first scale and the other one of the said scale and the marker is coupled to the second scale. The fifth and/or sixth scale may consist of color indications representing valid and invalid relative weight indication ranges. If a fifth and/or sixth scale are present, it is preferably arranged on the same face as the other scales.

The first, second and third scales are preferably each constituted by a series of markers and associated numbers, as in conventional wheel calculators and slide rule calculators. The fourth scale, however, preferably consists of color indications representing relative weight classes. By using color indications the relative weight class indicated by the device can be easily identified, thus allowing a quick read-out. In addition, the colors may be chosen such that they are indicative of the health of the person, for example green indicating a normal or desired relative weight class and red indicating overweight.

Various relative weight indications may be used, such as the weight/height^P measure, where P is the waist to hip ratio. It is preferred, however, that the relative weight indication is indicative of a relative weight class according to the Body Mass Index (BMI). This is a very suitable index which is widely recognized.

An advantageous embodiment further comprises a pointer for pointing to the first scale, such that the weight value pointed at corresponds to the relative weight indicator value, preferably the Body Mass Index value. This allows a direct reading of the indicator value to be made, in addition to the relative weight class indicated by the fourth scale.

The device of the present invention is preferably essentially planar and may have a substantially oblong design resembling a slide rule calculator. In such embodiments, the first scale and the second scale are slideable relative to each other, and may for example be printed on separate longitudinal pieces of plastic, carton, paper, metal or wood. However, the device may also have a substantially round design resembling a wheel calculator. In those embodiments, the first scale and the second scale are rotatable relative to each other, and may for example be printed on separate circular pieces of plastic, carton, paper, metal or wood.

When a substantially circular design is used, at least one scale may be printed on a circular information carrier, such as a CD or a DVD.

The present invention also provides a method of providing a relative weight indication of a person based on the person’s weight and height, the method comprising the steps of:

- providing a first scale representing weight,
- providing a second scale representing height,
- providing a third scale representing the age of the person, and
- providing a fourth scale representing the relative weight indication,

wherein the second scale is moveable relative to the first scale such that the weight and the height of the person can be matched, and wherein one of the third scale and the fourth scale is coupled to the first scale and the other one of the third scale and the fourth scale is coupled to the second scale, such that matching the weight and the height of the person allows the relative weight indication to be read from the fourth scale at the age indicated by the third scale.

Advantageously, the scales may be shown on the screen of a computer, mobile communication device, personal digital assistant, or other electronic device. The mobile communication device may be a mobile (cellular) telephone apparatus. The electronic device may be a portable, dedicated consumer device, arranged for providing a relative weight indication of a person based on the person's weight and height. If an electronic device is used instead of a (not electronic) device made of carton or sheet plastic, the scales are not tangible. In this case, the step of matching scales may be carried out automatically in response to weight and height values entered using a keypad, a touchpad or a speech recognition apparatus.

The present invention additionally provides a computer program product for carrying out the method as defined above. A computer program product may comprise a set of computer executable instructions stored on a data carrier, such as a CD or a DVD. The set of computer executable instructions, which allow a programmable computer to carry out the method as defined above, may also be available for downloading from a remote server, for example via the Internet.

The present invention will further be explained below with reference to exemplary embodiments illustrated in the accompanying drawings, in which:

Fig. 1 schematically shows a preferred embodiment of the device according to the present invention.

Fig. 2 schematically shows a first part of the preferred embodiment of Fig. 1 in isolation.

Fig. 3 schematically shows a second part of the preferred embodiment of Fig. 1 in isolation.

The embodiment of the inventive device 1 shown merely by way of non-limiting example in Fig. 1 comprises a first or upper part 3 and a second or lower part 4. In the embodiment shown, both parts are circular but the invention is not so limited. The parts may be made of paper, carton, metal or any other suitable material, although plastic is preferred. The first or upper part 3 has a smaller diameter than the second or lower part 4, so as to leave an edge area of the second part free.

The circular parts 3, 4 are rotatably connected by a suitable connecting element 2, such as a rivet. In the embodiment shown, a first scale 11 representing weight is provided on the second or lower part 4 while a second scale 12 representing height is provided on the first or top part 3, as indicated in Figs. 2 & 3. In alternative embodiments this arrangement of the scales on the respective parts may be reversed.

The second (or height) scale 12 is arranged at the edge of the first part 3 so as to co-operate with the first (or weight) scale 11. Third scale sections 13a and 13b representing age are in the embodiment shown provided on the first part 3, while fourth scale sections 14a and 14b representing a relative age indication are provided on the second part 4.

In the embodiment of Figs. 1-3, the third scale sections 13a & 13b indicate an age range of 2 to 18 years. The Body Mass Index (BMI) is typically not used for children under the age of 2, while the generally accepted BMI classification is essentially constant for ages over 18. The readings at age 18 may therefore also be used for adults. Accordingly, the present invention may also be used for ages outside the range of 2-18 years.

The third scale additionally comprises a first section 13a which is used for boys and adult men, and a second section 13b which is used for girls and adult women. The scale sections 13a and 13b are essentially identical but have different locations on the first device part 3, so as to allow reading out different sections 14a and 14b respectively of the fourth scale.

The fourth scale, which represents various BMI classes, is in the embodiment shown constituted by properly shaped regions having different colors, each colored region indicating a particular BMI class, for example normal, underweight, severe underweight, overweight, etc.. Fig. 3 shows the fourth scale 14a, 14b in more detail. The embodiment shown distinguishes seven relative weight (e.g. BMI) classes, but other distinctions comprising more or fewer different classes, or other boundary values of the classes, may be used instead. A legend 18 (Figs. 1 and 2) to the fourth scale may be provided on the first part 3 of the device.

By turning the parts of the device relative to each other, a person’s weight (e.g. 39 kg) on the first scale 11 can be aligned with his height (e.g. 125 cm) on the second

scale 12. As mentioned above, the third scale sections13a & 13b are on the same part of the device as the first scale 11, while the second scale 12 is on the same part as the fourth scale sections 14a & 14b. Accordingly, matching the weight with the height by turning one part relative to the other will cause the third scale sections 13a & 13b to be properly positioned relative to the fourth scale sections 14a & 14b. That is, the position of the third scale sections 13a & 13b relative to the fourth scale sections 14a & 14b will take the weight relative to the height into account. Now the appropriate BMI class can be read from the fourth scale at the age indicated by the third scale. It is noted that the sections 13a & 13b are each at least partially open and/or transparent so as to allow the fourth scale to be visible, preferably through the third scale. It is further noted that embodiments can be envisaged in which the third and fourth scale each comprise a single section only, thus making no distinction between male and female. Alternatively, in some embodiments of the present invention the third and fourth scales may each comprise three or more sections (that is, scale parts), thus distinguishing between three or more different groups of people.

In the embodiment shown, the age axes of the third scale sections 13a & 13b extend along the radius of the circular first part 3. Embodiments can be envisaged in which these axes have a non-zero angle relative to the radius, in which these axes have a two-dimensional shape, and/or in which each axis is divided into separate components.

As mentioned above, the fourth scale sections 14a & 14b are constituted by colored regions. However, embodiments can be envisaged in which the fourth scale comprises markers and numbers, as in the first, second and third scales.

The embodiment shown further comprises a fifth scale 15 arranged on the second part 4. The fifth scale 15 essentially consists of a number of colored regions, in the present example two distinct regions, which indicate whether any indication read from the fourth scale is correct or incorrect (“off scale”). The respective regions of the fifth scale are advantageously green and red, and can be seen through an opening or transparent section 16 in the first or upper part 3 of the device.

A BMI indicator 17 is also arranged on the first part 3. In the embodiment shown, the scales are designed in such a way that the tip 10 of the BMI indicator 17 is located at a height equal to 1 m (100 cm). When a person’s weight and height have been matched using the first and second scales, the tip 10 points to that person’s BMI on the weight scale 11. That is, the “weight” reading on the first scale 11 then represents the BMI value, which can be used for comparison with a table, as in the Prior Art. It is noted that the device of the present invention can be used perfectly well without determining the BMI value.

The embodiment shown also comprises a sixth scale 19 arranged on the second part 4. This sixth scale 19 essentially consists of a number of colored regions, in the present example two distinct regions, which indicate whether any indication read from the "BMI scale" (first scale 11 when used for determining the BMI) is correct or incorrect ("off scale"). BMI values in the range of 60-100, for example, are extremely unlikely and may therefore be labeled "off scale". The respective regions of the sixth scale 19 are advantageously black and red, and can be seen through an opening or transparent section which preferably coincides with the BMI indicator section 17 in the first or upper part 3 of the device.

In an alternative embodiment, the area shown in Fig. 3 as the sixth scale 19 (or any other suitable area of the second part 4) is transparent, allowing the back of the first part 3 to be visible from the bottom face of the device. An additional scale could be provided on this back side of the first part 3, that is, on the side of the first part 3 not shown in Figs. 1 & 2. This additional scale could, for example, indicate a BMI value or any other suitable value.

In the preferred embodiment shown the values of the first scale 11 are arranged in such a way that each value has the same location on the scale as its multiple of ten. For example, the value "20 kg" has the same location on the first scale 11 as the value "200 kg". This "infinite scale" allows the device of the present invention to be compact yet very flexible.

As mentioned above, the parts 3 & 4 of the device can be made of e.g. plastic or carton. In one embodiment, one of the parts is constituted by an information carrier, such as a CD, a DVD or a similar carrier. The information stored on the carrier may comprise instructions for use, advice regarding dieting and/or exercise, and/or other information.

The device of the present invention may additionally comprise a third part mounted on the opposite or bottom face, that is, on the side of the second part 4 facing away from the first part 3. This third part (not shown) may comprise further scales, for example scales in other units. In a particularly advantageous embodiment, the scales of the bottom side of the device may be identical to those of the top side except for the units, the top side (upper face) having metric (cm, kg) scales and the bottom side (lower face) having US or UK scales (inches, pounds/stones). In such an embodiment, the bottom face of the second part 4 could also be provided with a fourth scale (14 in Fig. 3). In this way, a device is provided which can be used in various countries without any further adaptations.

The embodiment shown in Figs. 1-3 is circular, resembling a wheel calculator. Rectangular and/or longitudinal embodiments are also possible, for example

embodiments resembling a slide rule. In such embodiments, turning the parts is substituted with sliding the parts.

Those skilled in the art will be able to adapt the device of the present invention to other units, such as pounds and feet, or pounds and stones, without requiring any inventive effort. Similarly, changing the shape or orientation of the third scale mechanically translates into an adaptation of the fourth scale. Although the relative weight indication mentioned above is the BMI, other relative weight indications can also be used, and the device can be similarly adapted.

The present invention also provides a computer program for carrying out the method steps, in particular the steps of matching the weight and the height of the person, thus allowing the relative weight indication to be read from the fourth scale sections 14a & 14b at the age indicated by the third scale sections 13a & 13b. Such a computer program may be carried out by a personal computer, a remote server, or a handheld device. A remote server may be accessed via the Internet. A handheld device may comprise a suitably programmable mobile telephone device, a PDA (Personal Digital Assistant), or a dedicated consumer device.

The present invention is based upon the insight that at least one age scale should be used when determining a relative weight indication, such as a BMI value. The present invention benefits from the further insight that it is not necessary to determine the value of the relative weight indication when determining a relative weight class.

It is noted that any terms used in this document should not be construed so as to limit the scope of the present invention. In particular, the words “comprise(s)” and “comprising” are not meant to exclude any elements not specifically stated. Single elements may be substituted with multiple elements or with their equivalents.

It will be understood by those skilled in the art that the present invention is not limited to the embodiments illustrated above and that many modifications and additions may be made without departing from the scope of the invention as defined in the appending claims.

Claims

1. A device (1) for providing a relative weight indication of a person based on the person's weight and height, the device comprising:

- a first scale (11) representing weight,
- a second scale (12) representing height,
- a third scale (13a, 13b) representing the age of the person, and
- a fourth scale (14a, 14b) representing the relative weight indication,

wherein the second scale (12) is moveable relative to the first scale (11) such that the weight and the height of the person can be matched, and wherein one of the third scale and the fourth scale is coupled to the first scale (11) and the other one of the third scale and the fourth scale is coupled to the second scale (12), such that matching the weight and the height of the person allows the relative weight indication to be read from the fourth scale (14a, 14b) at the age indicated by the third scale (13a, 13b).

2. The device according to claim 1, wherein the third scale and the fourth scale each comprise a first part (13a; 14a) and a second part (13b; 14b), the respective first parts being adapted for males and the respective second parts being adapted for females.

3. The device according to claim 1 or 2, wherein the first scale (11), the second scale (12), the third scale (13a, 13b) and the fourth scale (14a, 14b) are all arranged on one face of the device.

4. The device according to any of the preceding claims, further comprising a fifth and/or sixth scale (15, 19) indicative of a valid relative weight indication range and a marker (16, 17) allowing the range to be read from the said scale, wherein one of the said scale (15, 19) and the marker is coupled to the first scale (11) and the other one of the said scale (15, 19) and the marker is coupled to the second scale (12).

5. The device according to claim 4, wherein the fifth and/or sixth scale (15, 19) consists of color indications representing valid and invalid relative weight indication ranges.

6. The device according to any of the preceding claims, wherein the fourth scale (14a, 14b) consists of color indications representing relative weight classes.

7. The device according to any of the preceding claims, wherein the relative weight indication is indicative of a relative weight class according to the Body Mass Index (BMI).

8. The device according to claim 7, further comprising a pointer (17) for pointing to the first scale (11), such that the weight value pointed at corresponds to the Body Mass Index value.

9. The device according to any of the preceding claims, wherein the first scale (11) and the second scale (12) are slideable relative to each other.

10. The device according to any of claims 1 - 9, wherein the first scale (11) and the second scale (12) are rotatable relative to each other.

11. The device according to claim 10, wherein at least one scale is printed on a circular information carrier, such as a CD or a DVD.

12. A method of providing a relative weight indication of a person based on the person's weight and height, the method comprising the steps of:

- providing a first scale (11) representing weight,
- providing a second scale (12) representing height,
- providing a third scale (13a, 13b) representing the age of the person, and
- providing a fourth scale (14a, 14b) representing the relative weight indication,

wherein the second scale (12) is moveable relative to the first scale (11) such that the weight and the height of the person can be matched, and wherein one of the third scale and the fourth scale is coupled to the first scale (11) and the other one of the third scale and the fourth scale is coupled to the second scale (12), such that matching the weight and the height of the person allows the relative weight indication to be read from the fourth scale (14a, 14b) at the age indicated by the third scale (13a, 13b).

13. The method according to claim 12, wherein the scales are shown on the screen of a computer, mobile communication device, personal digital assistant, or other electronic device.

14. The method according to claim 12 or 13, wherein the step of matching scales is carried out automatically in response to entered weight and height values.

15. A computer program product for carrying out the method according to claim 12, 13 or 14.

Abstract

A device (1) for providing a relative weight indication of a person based on the person's weight and height comprises a first scale representing weight and a second scale representing height. The second scale is moveable relative to the first scale such that the weight and the height of the person can be matched. The device further comprises a third scale representing the age of the person, and a fourth scale representing the relative weight indication. One of the third scale and the fourth scale is coupled to the first scale and the other one of the third scale and the fourth scale is coupled to the second scale, such that matching the weight and the height of the person allows the relative weight indication to be read from the fourth scale at the age indicated by the third scale. The fourth scale may comprise color-coded relative weight indication classes. The relative weight indication preferably represents a Body Mass Index value which is adjusted for the age and the sex of the person involved.

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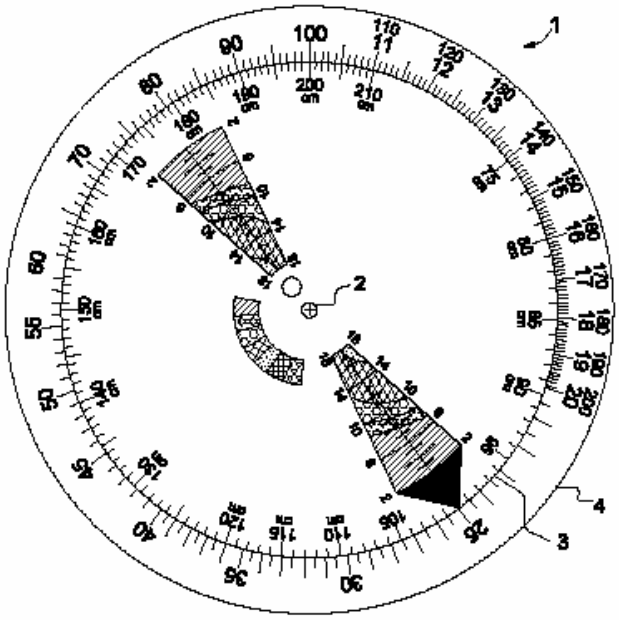

FIG. 1

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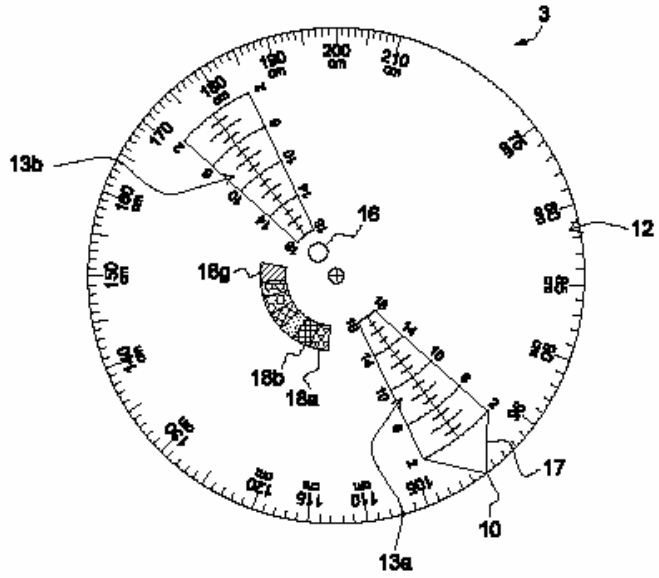

FIG. 2

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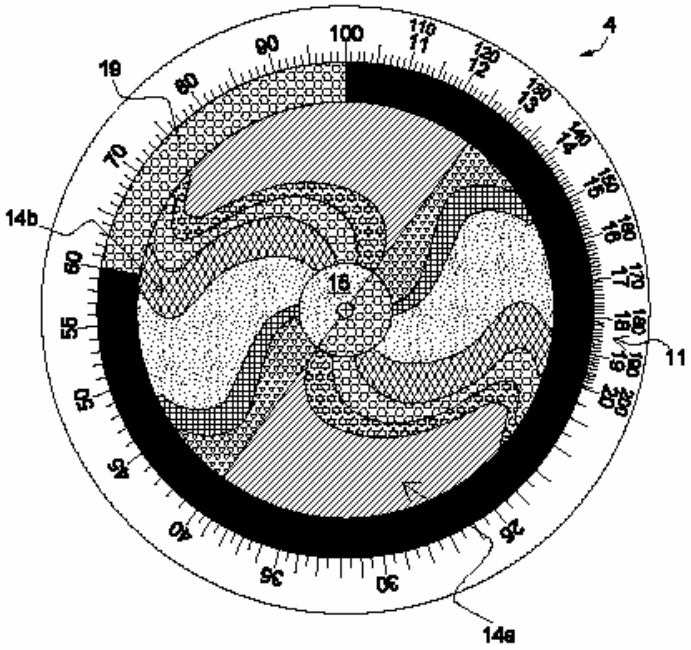

FIG. 3