

ANTI-BEDSORE MATTRESS

Field of the Invention

The present invention relates to the field of engineering or science, especially material
5 engineering or material science in relation to anti-bedsore mattress.

Background of the Invention

Patients who need bed rest for a medical treatment or a follow-up at hospital or at home for
a long period often have a pressure on bony areas of the body, e.g. back of the head 1, shoulders 2,
elbows 3, bottoms 4, heels 5, legs 6, thighs 7, hips 8, or ears 9 as shown in figure 1. If patients are
10 unable to move their body by themselves or they need to stay in bed in a certain position and not
being assisted by someone to change the body position every 2 hours, then there is a high chance
of having bedsore at the areas where the body is pressed within only 2-3 days wherein the areas of
the body that have high chance of bedsore are the coccyx, back of the head, hips, and heels area,
etc. In the field of public health, there is a design of patient bed to prevent bedsore in 2
15 characteristics:

- a) A mattress that provides movement to prevent the areas of the body from being pressed
at a certain position for long period.
- b) A mattress that provides weight distribution to prevent excessive pressure at any
position that causes bedsore.

20 For the mattress that provides movement, some of the prior arts have been found, e.g. a
design of patient bed separating the bed base into 2 parts or more as shown in US patent application
no. US5233712 of the invention titled "Pressure relief bed" or as shown in Thai invention patent
application no. 0501000630 of the invention titled "Patient bed preventing bedsore" which refers to
a design of bed base that alternately moves upward on one part and downward on the other part in
25 each specified time from 1-30 minutes. The system controlling the upward and downward
movement of bed base by using a hydraulic system which works well for resolving bedsore issue,
However, the disadvantage is that the upward and downward movement of the bed base bother the
patients and it requires several equipment which results in a large-sized bed that is inconvenient to
move and easy to get broken. Also, as it is an electrical system, the mattress cannot be used when

there is electricity cut-off and it is not suitable for the use in the rural areas where electricity is not available.

The mattress made of several air bags arranged in order and the air is pumped in and out to lift up patients' weight at many positions as shown in Japanese patent application no. JP2000-189472 of the invention titled "Bedsore prevention apparatus" or US patent application no. US5815864 of the invention titled "Microprocessor controller and method of initializing and controlling low air loss floatation mattress" or US patent application no. US4825486 of the invention titled "Bedsore-preventing air mattress controller" or Thai invention patent application no. 0801004806 of the invention titled "A skid for preventing bedsore with a system controlling pressure and sinking level of patient body" wherein these are the kind of anti-bedsore mattresses which are currently available in the market due to its light weight and simple mechanism, but the disadvantage of this system is that it requires electricity to control the air bag, and having a great number of air bags makes it difficult for cleaning all the air bags and if the electricity is cut off or discontinued, the air bags will be deflated and patient body will sink into the air bag abruptly.

In addition, some of the prior arts regarding other embodiments of anti-bedsore mattress have been found. For instance, Chinese patent application no. CN203898582 of the invention titled "Pressure sore preventing rolling massage bed" refers to a bed designed to have a roller at the bed base which leads to a constant shift of load-bearing point and in the same time it acts as a massager. Slovakia patent application no. SK50522016 of the invention titled "Bed-sore preventing electromagnetic cushion" refers to the design of bed base as a square wherein each part can be lifted upward and downward controlled by an electromagnetic system. Korean patent application no. KR101895054 of the invention titled "Bed preventing pressure sore" refers to the design of bed allowing an overturn of patients automatically in a specified time. Korean patent application no. KR20080075812 of the invention titled "Silicone cushion for preventing bed sore" refers to the design of bed base covered by silicone rubber wherein the silicone rubber can be inflated in circular leading to the lift of patient body. However, these systems require electricity, therefore it is not suitable for the use in rural area where electricity is not available.

Referring to a bed providing weight distribution to prevent an excessive pressure at any position that causes bedsore, this system uses supporting material that is soft or flexible enough to

distribute the force evenly at every position, not causing high-pressure areas that lead to a cessation of blood flow that leads to bed sore. Examples of this system are as follows:

According to Thai invention patent application no. 0101002164 of the invention titled “Anti-bed sore mattress”, an anti-bed sore mattress comprises square cloth bags containing balloons
5 which is used as a load-bearing element of patients instead of using air bed. The mattress is separated into at least 4 rooms. The side portion of the mattress has a zipper for the opening to fill the balloons into the mattress which negatively results in that the balloons are not held at a certain position. When pressing them down, they often leak out air in which this causing the inconsistency of balloon strength. Furthermore, as the air leaks out of the balloons, it requires taking the balloons
10 out and blow the air back in and fill the balloon back in the mattress again. As a result of this constant maintenance, it adds on more work load each day.

According to Thai petty patent application no. 0503000511 of the invention titled “Anti-bed sore mattress made of square-pocket cloth containing rubber gloves filled with water or air”, an anti-bed sore mattress made of square-pocket cloth containing rubber gloves filled with water or air
15 provides negative results due to the inconsistent shape of rubber gloves which results in an uneven arrangement in the square pocket and uneven strength. Besides, rubber gloves are quite thin since they are not designed for load-bearing purpose. Hence, it is easy to have a leak which results in a wet mattress that requires constant maintenance.

According to Thai petty patent application no. 0903000277 of the invention titled
20 “Waterbed for patients”, a waterbed for patients is made of flexible pipe carrying water in it. The pipe supports patients and it can be filled with water at either high or low pressure. However, the material, size, and thickness of the pipe are not identified as well as water pressure which is not specified. Hence, it is unable to specify the level of pressure resistance of the bed. Also, water filling causes heavy mattress and it is more difficult to change the mattress on its bed than using
25 regular mattress.

According to Thai petty patent application no. 1503000574 of the invention titled “Anti-bed sore waterbed/water bag and healthy sleep for normal user”, a waterbed designed to be placed on a regular bed wherein the said waterbed comprising an upper-lower cloth sewn in square shape

pocket containing a zipped pocket for taking in/out a water bag wherein the water bag is a plastics bag or rubber bag. As it is taken that water flows, there should not be pressure resistance. Still, in real-life use within covered containers, when there is a pressure on water, the volume of water changes slightly and it comes a pressure resistance. Hence, using water as a support for reducing pressure works well at early stages. When supporting containers (water bags) are tight, the surface of containers will control pressure resistance. Then, the reduction of pressure is not going as expected.

According to Thai petty patent application no. 1503000574 of the invention titled “Anti-bedsore mattress”, an anti-bedsore mattress is characterized as urethane foam placing on a mounted-knobby plastic sheet that allows the air to flow underneath. The mattress has six pieces but there are only 5 pieces to be used. The other 1 piece is an alternate in case of changes when cleaning. This kind of foam is punched for the air flow, so it dries faster than a normal foam. The advantage of this mattress is that it is lightweight, and it dries out quickly, however it does not identify how much pressure resistance on patients when it bears the weight. The disadvantage of urethane foam is its short service life. After 3-6 months of using, the foam becomes flattened and requires frequent test (*Rehabilitation of patients with bedsore*, Dr. Prachayaporn Khammueanglue, Dept. of rehabilitation medicine, faculty of medicine, Chiangmai University, chapter 3, p. 75). Besides, using urethane foam as a patient bed possibly allows a rapid growth of microbes and it is not suitable to use in the hospital (Wong Niap Poh, *Elastomeric*, December 1989, p. 9).

According to Japan patent application no. JP2018187055 of the invention titled “Bed sore prevention device”, the making of a ring shape material attached on patients’ clothes in the areas where it tends to have a bedsore prevents the areas from being pressed. This method might cause a pressure at the areas around the ring and leads to insufficient blood flow at the area which causes more bedsore or recovery delay of bedsore.

According to the information above, it is obvious that there are still some defects in anti-bedsore mattresses in the prior art that cause inconvenience of use, require several equipment, or require electrical power which limits usage location. Especially the information in Thai petty patent application no. 0503000511 of the invention titled “Anti-bedsore mattress made of square-pocket cloth containing rubber gloves filled with water or air”, the factor that causes bedsore is the

pressure. If there are more than 35 mmHg of pressure in any area, there is lower amount of blood flow in the areas. If there are more than 70 mmHg of pressure for more than 2 hours, there will be the lack of culture media and oxygen. If there are more than 80 mmHg of pressure for long period, the tissue dies and eventually causes bedsore. In addition, it is mentioned in the document titled

5 “Rehabilitation of patients with bedsore” by Dr. Prachayaporn Khammueanglue, Dept. of rehabilitation medicine, faculty of medicine, Chiangmai university, on chapter 3 page 75 that the pressure on tuberosity should be reduced to less than 60 mmHg which suggests the significance of pressure on the body that must be less than 70 mmHg. Preferably, it should be less than 60 mmHg. In the above-mentioned prior art, none of those patents mentions about the level of capacity

10 of those mattresses in pressure reduction on tuberosity. Hence, the present invention is developed to solve the above-mentioned problems wherein it provides an anti-bedsore mattress made of natural latex wherein the appropriate density is specified, and it helps support organ weight at a pressure point without causing more than 60 mmHg of pressure at any point.

Summary of the invention

15 Anti-bedsore mattress comprises a mattress made of natural latex wherein it provides density of natural latex between 65 to 90 kg/m³ wherein the upper surface provides blank space throughout the said side of surface and the lower surface provides plain surface characteristic or connected curl wherein load-bearing point is separated into three parts comprising a coccyx supporting part having 65 to 90 kg/m³ of a density of natural latex foam and 5 to 7.5 cm of

20 thickness, and the top part and bottom part having 65 to 85 kg/m³ of a density of natural latex foam and 5 to 7.5 cm of thickness.

The purpose of present invention is to provide anti-bedsore mattress which helps support organ weight at a pressure point without causing more than 60 mmHg of pressure at any point which helps prevent patients from bedsore during bed rest. The mattress is made of easy-to-find

25 materials and having distributor in the country. The utilization is not complicated, so it helps facilitate the usage. It also reduces energy and treatment cost since it does not require electrical power for the usage of anti-bedsore mattress according to this present invention. Hence, it is another way to help develop national economy that helps people in all sectors to have access to public health service efficiently.

Brief description of the drawings

Figure 1 shows an embodiment of pressure occurring to patient body that might cause bed sore.

Figure 2 shows an embodiment of anti-bed sore mattress for a patient who lies on his back according to this present invention.

5 Figure 3 shows an embodiment of anti-bed sore mattress for a patient who lies on his side according to this present invention.

Figure 4 shows an embodiment of relation between a density of natural latex foam and indentation hardness index.

Detailed description of the invention

10 Figure 2, an anti-bed sore mattress comprises a mattress made of natural latex foam which provides between 65 to 90 kg/m³ of a density of natural latex foam wherein the upper surface provides blank space throughout the said side of surface while the lower surface provides plain surface characteristic or connected curl providing support for patient body. Said anti-bed sore mattress separates load-bearing point into three parts comprising:

15 The coccyx supporting part 20 acting as a support of coccyx provides thickness lower or equal to the top part 30 and the bottom part 40 wherein it provides to have 5 to 7.5 cm of thickness and 65 to 90 kg/m³ of a density of natural latex foam. The coccyx supporting part 20 preferably provides to have 40 to 50 cm width of coccyx supporting space 20 and is position next to the center of mattress length at least 10 cm upward. The width of coccyx supporting space 20 provides to be
20 equal to the width of the mattress.

The top part 30 acts as a body support from head to waist, and the bottom part 40 acts as a support for lower-part body next to coccyx and waist to feet. They have 5 to 7.5 cm of thickness and 65 to 85 kg/m³ of a density of natural latex foam.

For the blank space throughout the upper surface of anti-bed sore mattress, it provides to
25 have 10 to 15 mm of diameter and have a gap between each blank space at the range between 25 to 35 mm. These spaces act as a pressure distribution and helps to add better air flow.

The Anti-bedsore mattress according to this invention provides additional assembly with a supporting cushion 10 made of natural latex foam having 55 to 75 kg/m³ of its density and having 1.5 to 2.5 cm of thickness placing on the anti-bedsore mattress to reduce the unevenness texture or inconsistency at a joint between the coccyx supporting part and the top part and bottom part.

5 According to figure 2, it is an embodiment of anti-bedsore mattress which is suitable for a patient who lies on his back since patient body spreads out as well as a pressure spreading out at parts of the body touching the mattress. Hence, a mattress for patients who lie on their back does not need to be that thick.

Figure 3 shows anti-bedsore mattress which is suitable for patients who lies on his side
10 which provides to have additional supporting cushion 50 below the mattress wherein the supporting cushion 50 is made of natural latex having between 75 to 85 kg/m³ of its density and have 2.5 to 7.5 cm of thickness. Since there will be much pressure on coccyx when patients lie on their side, it is required to lift up other parts of the body to distribute the pressure in order for the reduction of pressure on coccyx wherein the top part 20 and the bottom part 30 of the mattress are
15 harder than coccyx supporting part 20.

In addition, anti-bedsore mattress provides additional assembly with a mattress cover made of water-repellent materials which can be chosen from any one or two together of cloth or synthetic leather to prevent anti-bedsore mattress from hardness which will provide much more pressure.

In order to use, lay the anti-bedsore mattress down and cover the upper part with a
20 supporting cushion 10. Then, put a mattress cover on. To use with patients who lie on their side, lay down supporting cushion 50 below and then place the anti-bedsore mattress on top. It also provides additional assembly with a pillow made of natural latex having 50 to 65 kg/m³ natural latex density and having 4 to 15 cm of thickness acting as a support for patient head.

Examples hereinafter illustrate the development of anti-bedsore mattress according to the
25 present invention which is not limited to only examples disclosed herein and it should not be a limitation of the invention.

The selection of materials for the production of anti-bedsore mattress

- Selected testing materials are many-layers soft cloth, polyurethane gel with different thickness and different softness, balloon bag made as pipe with 3 different sizes for filling water and air, and natural latex foam. These materials will be measured the hardness of surface at first by using a foam hardness meter called Durometer Hardness Asker F manufactured by Kobunshi Keiki Co., Ltd. which has 25.2 mm diameter of press. The spring is used as a resistance and the dial shows the result as 0-100 wherein the 0 point has 55 gm of resistance and the 100 point has 455 gm of resistance. As for natural latex foam, apart from the measurement of surface hardness, there is a calculation of density (kg/m^3) and indentation hardness index (N) according to ASTM D-1055-90 standard as well.
- For the primary test, 3.8 kg of manikin head is pressed on supporting materials to calculate the pressure. Test result is shown in the following table:

Supporting Material	Characteristic	Surface Hardness, Asker F	Pressure (mmHg)	Remark
None	-	-	221	
Many-layers soft cloth	2.5 cm of thickness	19	185	
Polyurethane gel	10 mm	50	164	
Polyurethane gel	20 mm	45	157	
Polyurethane gel	30 mm	42	131	
Polyurethane gel	40 mm	28	100	
Polyurethane gel	40 mm	6-7	229	(Too watery that the trier touches hard floor)
Water balloons arranged in order in cloth bags	Cylinder with 3.5 cm of diameter	51	146	
	Cylinder with 7.0 cm of diameter	48	90	
	Cylinder with 10.0 cm of diameter	55	95	

Supporting Material	Characteristic	Surface Hardness, Asker F	Pressure (mmHg)	Remark
Air balloons arranged in order in cloth bags	Cylinder with 3.5 cm of diameter	58	148	
	Cylinder with 7.0 cm of diameter	53	105	
	Cylinder with 10.0 cm of diameter	55	79	
Latex foam pillow	6.3 cm of thickness 63.5 kg/m ³ of density 68.6 N of indentation index	6	57	
Latex foam pillow	12 cm of thickness 63.5 kg/m ³ of density 68.6 N of indentation index	5	34	
Latex foam pillow covered with elastic cloth	12 cm of thickness 63.5 kg/m ³ of density 68.6 N of indentation index	8	43	

According to the primary test result, it is obvious that the best supporting material in the primary test is natural latex foam. Hence, the following study will test with natural latex foam only and the expected pressure-related data is user and supporting cushion.

- 5 For user, there are 2 factors which are a) particular characteristic of each person (weight, height for body mass index calculation). Body mass index or indicator of fat is calculated by weight/height^2 , and b) lying position characteristic (lying on one's back and lying on one's side).

For supporting cushion, natural latex, there are 2 factors which are cushion thickness and softness/hardness.

Pressure-bearing test of anti-bedsore mattress at different factors

A sample of 34 people have been taken to the test to find a particular characteristic by taking weight measurement, taking height measurement, and calculating BMI wherein the amount of weight of the sample is 43-87 kg, the height is 1.45-1.70 m, and the BMI is 18.2 to 36.9. Then, separate into 5 groups which is the slim who has 18.5 lower of BMI, the normal who have between 18.5-24.9 of BMI, the obese who have between 25.0-29.9 of BMI, and they will be regarded as having obesity if the BMI is more than 30. Then, a sample of 9 people have been taken to the test to find pressure amount dividing by body mass index as in the table below wherein the 1st person is counted as the slimmest person in the group and the 9th person is counted as the most obese person in the group.

Person	Body Weight (kg)	Height (m)	BMI
1	50.9	1.67	18.2
2	43.6	1.50	19.4
3	60.0	1.70	20.8
4	51.5	1.52	22.3
5	62.0	1.60	24.2
6	68.9	1.60	26.9
7	59.3	1.45	28.2
8	82.1	1.55	34.2
9	86.3	1.53	36.9

As for natural latex foam, materials having 1 to 3 inches of thickness are provided and having between 65 to 110 kg/m³ of density. High-density natural latex foam has high level of hardness or indentation index accordingly as shown in figure 2.

In lying test, there is natural latex foam pillow having 6.3 cm of thickness and 60 to 65 kg/m³ of density supporting the head for reducing a pressure at head area to keep the pressure low all over the test in order to study about a pressure at specific areas of the mattress below the head area.

Lying position affects a pressure of body wherein it is found that the body spreads out greater when lying on one's back rather than lying on one's side which results in less pressure when lying on one's back than lying on one's side. A pressure occurring when lying on one's back often occurs at shoulders, coccyx, and heels. For lying on one's side, it occurs at shoulders and hips as shown in the table below:

Person	Type of Latex Foam Used	Lying on One's Back				Lying on One's Side		
		Head	Shoulders	Coccyx	Heels	Head	Shoulders	Hips
1	1-inch-thick latex foam D65	46	65	49	49	34	65	154
	2-inches-thick latex foam D65	40	47	49	43	35	49	138
	3-inches-thick latex foam D65	38	49	47	40	26	62	101
5	1-inch-thick latex foam D65	35	37	52	48	49	65	78
	2-inches-thick latex foam D65	25	31	54	42	36	57	49
	3-inches-thick latex foam D65	32	29	42	27	30	42	50
8	1-inch-thick latex foam D65	37	41	67	41	30	69	84
	2-inches-thick latex foam D65	43	44	57	45	38	55	56
	3-inches-thick latex foam D65	47	39	43	36	33	53	62

*Shown numbers are the value of pressure in mmHg.

According to the table, it is obvious that a pressure in some cases is greater than 70 mmHg especially at the hips part of some samples and using thicker natural latex foam will help reduce pressure, and it is obvious that there is more pressure on the slim rather than the obese.

As for the thickness of latex foam, it affects the pressure as well, i.e. thicker latex foam provides less pressure. Using 2-inches-thick latex foam is enough to reduce a pressure of some samples; but for some people, it requires 3-inches-thick latex foam to reduce a pressure as shown in the following table:

Person	Type of Latex Foam Used	Lying on One's Back				Lying on One's Side		
		Head	Shoulders	Coccyx	Heels	Head	Shoulders	Hips
5	1-inch-thick latex foam D65	35	37	52	48	49	65	78
	2-inches-thick latex foam D65	25	31	54	42	36	57	49
	3-inches-thick latex foam D65	32	29	42	27	30	42	50
5	1-inch-thick latex foam D75	46	40	58	36	60	52	69
	2-inches-thick latex foam D75	40	39	52	39	45	44	58
	3-inches-thick latex foam D75	34	38	47	39	36	57	47
8	1-inch-thick latex foam D65	37	41	67	41	30	69	84
	2-inches-thick latex foam D65	43	44	57	45	38	55	56
	3-inches-thick latex foam D65	47	39	43	36	33	54	53
8	1-inch-thick latex foam D75	46	47	55	54	33	77	88
	2-inches-thick latex foam D75	49	45	58	37	34	88	54
	3-inches-thick latex foam D75	30	40	46	35	40	63	53

*Shown numbers are the value of pressure in mmHg.

A density of latex foam affects a pressure as well. The slim has not much fat supporting the body. Using foam which is too soft or thin, when bearing body weight, the body weight presses to the floor which results in high pressure; but if using thicker foam and greater density, it bears more pressure as shown in the following table:

Person	Type of Latex Foam Used	Lying on One's Back				Lying on One's Side		
		Head	Shoulders	Coccyx	Heels	Head	Shoulders	Hips
1	1-inch-thick latex foam D65	46	65	49	49	34	65	154
	2-inches-thick latex foam D65	40	47	49	43	34	49	137
	3-inches-thick latex foam D65	38	49	47	40	26	47	100
1	1-inch-thick latex foam D75	44	57	45	63	30	64	153
	2-inches-thick latex foam D75	35	44	61	42	37	90	96
	3-inches-thick latex foam D75	33	46	42	42	43	69	42

*Shown numbers are the value of pressure in mmHg.

However, a density of latex foam should not be too high. Otherwise, latex foam will become harder and turns out as the cause of bedsore as shown in the table below:

Person	Type of Latex Foam Used	Lying on One's Back				Lying on One's Side		
		Head	Shoulders	Coccyx	Heels	Head	Shoulders	Hips
5	2-inches-thick latex foam D65	25	36	54	41	36	56	50
	2-inches-thick latex foam D75	40	39	49	39	45	44	58

Person	Type of Latex Foam Used	Lying on One's Back				Lying on One's Side		
		Head	Shoulders	Coccyx	Heels	Head	Shoulders	Hips
9	2-inches-thick latex foam D95	33	55	52	54	42	57	62
	2-inches-thick latex foam D110	34	58	62	72	41	76	77
	2-inches-thick latex foam D65	51	59	60	67	46	61	56
	2-inches-thick latex foam D75	39	56	58	49	34	59	92
	2-inches-thick latex foam D95	23	60	54	81	22	78	50
	2-inches-thick latex foam D110	32	81	62	95	32	85	72

*Shown numbers are the value of pressure in mmHg.

Furthermore, using latex foam as a mattress might have covered cloth such as elastic cloth or synthetic leather to extend shelf life of latex foam and to make it easy to clean. Still, using synthetic leather (PVC-covered cloth) makes it easier to clean the cushion. It is suitable for the use in hospitals. Having the two types of covered cloth does not significantly affect the pressure as shown in the table below:

Person	Type of Latex Foam Used	Lying on One's Back				Lying on One's Side		
		Head	Shoulders	Coccyx	Heels	Head	Shoulders	Hips
6	2-inches-thick latex foam D75 no covered cloth	36	42	93	36	35	48	66
	2-inches-thick latex foam D75 covered white elastic cloth	37	57	79	49	28	55	63

Person	Type of Latex Foam Used	Lying on One's Back				Lying on One's Side		
		Head	Shoulders	Coccyx	Heels	Head	Shoulders	Hips
	2-inches-thick latex foam D75 covered synthetic leather	41	42	78	63	24	50	71
6	3-inches-thick latex foam D75 no covered cloth	35	28	59	37	31	52	52
	3-inches-thick latex foam D75 covered white elastic cloth	45	40	52	44	30	54	51
	3-inches-thick latex foam D75 covered synthetic leather	37	45	57	56	39	98	64
8	2-inches-thick latex foam D75 no covered cloth	49	45	58	37	34	88	54
	2-inches-thick latex foam D75 covered white elastic cloth	42	43	61	39	31	90	59
	2-inches-thick latex foam D75 covered synthetic leather	42	46	61	42	28	68	87
8	3-inches-thick latex foam D75 no covered cloth	30	40	46	35	40	63	53
	3-inches-thick latex foam D75 covered white elastic cloth	40	44	48	42	20	47	75
	3-inches-thick latex foam D75 covered synthetic leather	43	45	52	43	39	52	56

*Shown numbers are the value of pressure in mmHg.

The primary summary is that the pressure occurs the most at the coccyx when lying on one's back. Supporting latex foam cushion for this part should be softest which are 65 kg/m^3 of density and no less than 5 cm of thickness to ensure that the coccyx is in the area supported by soft latex foam. The width of cushion for this part is 50 cm while the length of this part is equal to the width of mattress, and the coccyx supporting part should be placed at least 10 cm above the center of mattress. The 50-cm-width of the coccyx supporting part covers the coccyx part of everyone using this mattress. The top part and the bottom part of mattress comprises 5-cm-thick latex foam having 75 kg/m^3 of density; and to prevent unfamiliar feeling at a joint of latex foam having 65 kg/m^3 of density and 75 kg/m^3 of density, a latex foam having 65 kg/m^3 of density should be placed all over the front side of cushion and the cushion will then be covered with cloth for further use. Anti-bedsore mattress according to the present invention has been tested to calculate the pressure volume on the coccyx with the samples group range from thin to fat person, and the pressure at coccyx is lower than 60 mmHg as shown in the table below:

Person	Body Weight (kg)	Height (cm)	BMI	Greatest Pressure on Coccyx (mmHg)
1	48.0	150	21.3	46.3
2	50.9	152	22.0	46.7
3	64.6	153	27.6	53.8
4	59.3	145	28.2	42.3
5	72.0	157	29.2	44.8
6	82.1	155	34.2	42.7

Any modification or change might become clear and can be made by those skilled in the art wherein it is still in the scope and spirit of this invention as in the adherent claims.

Best mode of the invention

The best mode of the invention is mentioned in detailed description of the invention.

Claims

1. An anti-bedsore mattress comprises a mattress made of natural latex foam
 wherein **it is characterized in that** it provides a density of natural latex foam between 65 to 90 kg/m³ wherein the upper surface provides blank space throughout the said side of surface while the lower surface provides a plain surface characteristic or connected curl wherein the load-bearing point is separated into three parts comprising a coccyx supporting part (20) having 5 to 7.5 cm of thickness and a top part (30) and a bottom part (40) having between 5 to 7.5 cm of thickness.
2. The anti-bedsore mattress according to claim 1 wherein the blank space provides 10 to 15 mm of diameter.
3. The Anti-bedsore mattress according to claim 1 wherein the blank space provides a gap between each space from 25 to 35 mm.
4. The Anti-bedsore mattress according to claim 1 wherein the mattress preferably provides the coccyx supporting part (20) having 65 to 90 kg/m³ of density of the natural latex foam.
5. The Anti-bedsore mattress according to claim 1 wherein the coccyx supporting part (20) preferably provides supporting space of 40 to 50 cm and positioned next to the central of mattress length at least 10 cm upward.
6. The Anti-bedsore mattress according to claim 1 wherein the mattress preferably provides the top (30) and the bottom (40) having a density of natural latex foam between 65 to 85 kg/m³.
7. The Anti-bedsore mattress according to claim 1 wherein it provides additional supporting cushion (10) made of natural latex foam having 55 to 75 kg/m³ of density and having between 1.5 to 2.5 cm of thickness placing on the top of anti-bedsore mattress.
8. The Anti-bedsore mattress according to claim 1 wherein it provides additional supporting cushion (50) made of natural latex foam having density between 75 to 85 kg/m³ and having between 2.5 to 7.5 cm of thickness placing at the bottom of anti-bedsore mattress.
9. The Anti-bedsore mattress according to claim 1 wherein it further provides additional mattress cover made of water-repellent material which can be chosen from any one or both of cloth or synthetic leather.

10. The Anti-bedsore mattress according to claim 1 wherein it provides additional pillow made of natural latex foam having a density of latex foam between 50 to 65 kg/m³ and having between 4 to 15 cm of thickness.