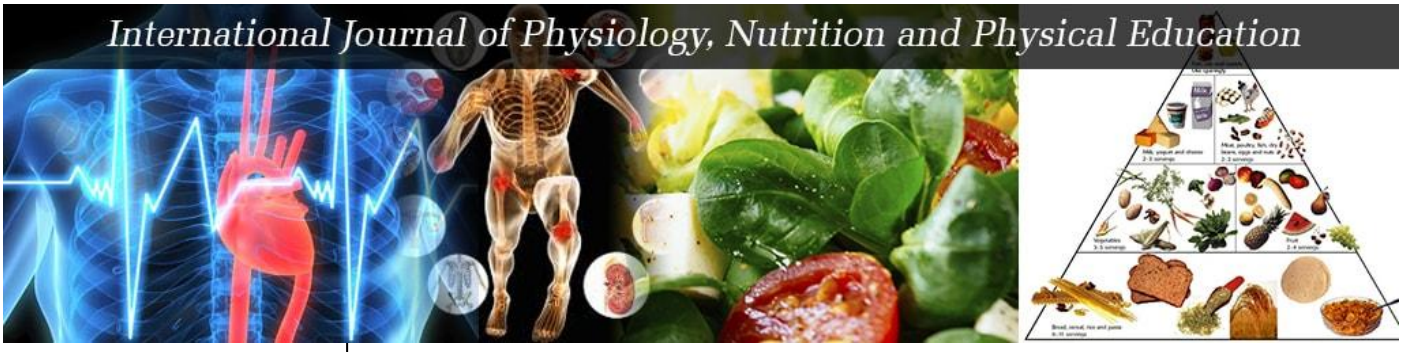

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Live along with tread mills for a better tomorrow

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Abstract
Tread wheels were introduced as a punishment in the earlier days, but treadmills have proved to be a boon for this generation. Jogging and running have their benefits. From keeping high blood pressure at bay to keeping us fit, running is something that we inculcate into our lives for a better us in a better tomorrow. But we tend to let laziness have its effect on our bodies sometimes when we have to hit the gym or step out of the house. To overcome this, Treadmills are something that we can run on, staying in the same place. Motorized treadmills are now a part of every healthy family. With the pace you want, treadmills are real heroes to be burning down calories and laziness. Without worrying about the climate outside, brisk walking and jogging on a treadmill is an easy way to complete the necessary aerobic activity. Of all the huge types of equipment in the gym, treadmills are the easiest to use. With its flat and even surface, you do not have to worry about hitting a bus, tripping over a rock or running into a park. With the motorized features and digital monitors, you can keep track of your progress and later appreciate yourself with a low-fat cupcake, making your heart happier. The primary purpose of this study was to find the qualities of treadmill that help to find out what is really important when trying to understand the integral part of a treadmill.

Keywords: treadmill, integral part, horsepower, motor

1. Introduction
The treadmill motor horsepower rating is probably the single most recognizable spec that jumps out at a consumer when he or she begins to do their buying research. It is most likely because we have all heard this term since we were young, and many of us think we know what it means. As tends to be our way of thinking, we usually believe bigger is better. However, the truth is, the ratings and numbers can be very confusing and ultimately incredibly misleading. The origins of the treadmill can be traced back to the 1st century AD. The treadmill originated in prisons. Exercising on a treadmill often feels like torture, and that's not exactly a coincidence. In 1818, an English civil engineer named Sir William Cubitt devised a machine called the "tread-wheel" to reform stubborn and idle convicts. Hence the eventual name treadmill. A treadmill is a device generally for walking or running or climbing while staying in the same place. Treadmills were introduced before the development of powered machines, to harness the power of animals or humans to do work, often a type of mill that was operated by a person or animal treading steps of a tread wheel to grind grain. In later times, treadmills were used as punishment devices for people sentenced to hard labour in prisons. The terms treadmill and tread wheel were used interchangeably for the power and punishment mechanisms. More recently, treadmills are not used to harness power, but as exercise machines for running or walking in one place. Rather than the user powering the mill, the machine provides a moving platform with a wide conveyor belt driven by an electric motor or a flywheel. The belt moves to the rear, requiring the user to walk or run at a speed matching that of the belt. The rate at which the belt moves is the rate of walking or running. Thus, the speed of running may be

controlled and measured. The more expensive, heavy-duty versions are motor-driven (usually by an electric motor). The simpler, lighter, and less expensive versions passively resist the motion, moving only when walkers push the belt with their feet latter are known as manual treadmills. According to Sports & Fitness Industry Association, treadmills continue to be the largest selling exercise equipment category by a large margin. As a result, the treadmill industry counts with hundreds of manufacturers throughout the World. The forerunner of exercise treadmills was designed to diagnose heart and lung disease, and was invented by Dr. Robert Bruce and Wayne Quinton at the University of Washington in 1952.Dr. Kenneth H. Cooper's research on the benefits of aerobic exercise, published in 1968, provided a medical argument to support the commercial development of the home treadmill and exercise bike. Among the users of treadmills today are medical facilities hospitals, rehabilitation centres, medical and physiotherapy clinics, institutes of higher education, sports clubs, Biomechanics Institute, orthopaedic shoe shops, running shops, Olympic training centres, universities, training centres, and home users.

2. Motor

This is the heart of the treadmill that will help keep "heart diseases away". Motors are one of the most important factors when searching for a treadmill. There are two types of motors – AC motor and DC motor. The AC motors are more powerful than the DC motors but have large power requirements. In a household treadmill, DC motor would run mostly by generating energy from batteries and will provide a steady operational speed. DC motors require less power and electricity.

3. Horsepower Ratings (HP)

Treadmill motor energy is measured in horsepower (HP) and is rated by the amount of horsepower provide. The higher HP rating, the larger and more powerful the motor. Peak HP is the highest point that a treadmill can reach, but cannot sustain, whereas, continuous HP (CHP) that the motor can sustain for long use without issues. Hence, when looking at motor HP, always look at the CHP. For example, a 2.0 CHP motor is actually more powerful than a 2.0 HP motor. Since, the former (CHP) measures the motor's ability to maintain a listed HP over an extended period of time and are the most accurate indicator of motor output, because it is performed at the voltage used in application by the particular motor. However, Experts agree that continuous-duty ratings are the more accurate indicator of true performance.

4. Recommended Horse Power

1. For walkers: a 2.0 horsepower continuous duty motor will be sufficient.
2. For joggers: 2.5 horsepower continuous duty should be the minimum.
3. For runners: 3.0 horsepower continuous duty or higher.
4. A person weighing more than 85 kg may opt for a treadmill with high horsepower for its smooth functioning.
5. Minimum recommendations have always been at least 1.5 CHP, with an RPM rating below 4000 would satisfy the needs of 90 percent of home users.

5. Terminology: the manufacture's

a) Treadmill Duty: This measures the horsepower for an average user at an average speed over an average period of time. As, it is an average; it is not a true representation of power.

b) Continuous Duty Rating (CHP): A continuous duty motor measures the minimum horsepower delivered at all points during a workout, and is a commercial grade standard applied to treadmills used in health clubs and higher-quality home treadmills and are the highest quality available also more powerful, last longer, and deliver smooth performance.

c) Peak Duty: It's the maximum horsepower a motor can generate when working at its hardest. This is only sustainable for a short time and also measure the power at the highest possible rpm with minimal load.

5.1 RPMS

Rotations per Minute (RPMs) is important in motor design and the torque which is the relationship between continuous horsepower and RPM that being the measure of a tendency to cause rotation; in other words, the power to turn that allows the motor to last longer and the most significant factor for determining the best suitable motor for one need. The lower the RPM of a motor, the more torque it will have, preferably a motor with an RPM rating of 4000 or lower, but never more than 5000is the best. The RPM is crucial because this is where a lot of manufacturers begin to play with, and heighten, the ratings above 2.5 in to the 3.5 and 4 HP range. However, one has to inspect the plate stamped on the treadmill and find RPM ratings so as to expect out of a quality treadmill and make sure that RPM tinkering is only one way in which a manufacturer can boost the horsepower rating of a treadmill motor. For example a motor that outputs 2.75 CHP (Continuous Horse Power) at 3200 rpm is actually stronger than a 3.0 CHP motor at 4000 rpm).

5.2 Belt Quality

The belt is what gets you running so the best quality would yield best results. 18 mm thickness is a good width for any treadmill to last long. There are belts which are reversible; using them will make the life of the belt twice of its normal life. Preferably with commercial grade nylon belt.

5.3 Striding Surface

A shorter belt will handle the shorter gait of a walker. If running, however, the stride will be longer. That necessitates a longer deck. An enough space to comfortably run without worrying about the feet falling off the back edge of the belt. That's a recipe for injury. Preferably with the dimension of 1640mm x 600mm.

5.4 DECK

The" Deck" is an important for the shock absorbent which is more biomechanically useful for long lasting.

5.6 Dimension

Dimension of the machine which more useful for the tread mill user and will indicate the height of tread mill from the ground level and also it will explains the total Machine weight capacity and the total user load. Most treadmills for professionals in the fitness area run for table sizes of about 150 cm long and 50 cm width. For athletes, larger and more stable treadmills are necessary. For example sprinters reach with some weight relief temporarily speeds of up to 45 km/h must therefore run on a large deck of up to 300 cm in length and have up to 100 cm width.

5.7 Maximum user's weight
Since the user weight which is one the significant measurable criteria for determining the commercial application of a tread mill. A typical treadmill must weigh anywhere between 175-250 pounds although the actual weight will largely depend on the size and type of the treadmill. Treadmills that support lower weight ranges are cheaper compared to ones that support a larger weight range that save the extra bucks. To choose treadmills based on the maximum weight they support will help ensure that one don't strain the motor.

5.8 Machine net weight
This specification which is very important as thread mill is concern. Since the machine net weight which is one the significant measurable criteria for determining the commercial application of a tread mill.

5.9 Maximum speed
The maximum speed of treadmills varies according to its quality and purpose. The highest-end commercial treadmills used to train elite athletes top out at 25mph. while the treadmills in fitness centre is between 12 and 14 mph. A typical treadmill runner has speed settings from about 0.5 to 12 mph.

5.10 Incline
Inclinations are useful for the treadmill user to determine and the degree of difficulty while using the machine for better cardiac output. There two methods: Electric and Electronics. The former is useful for the user to determine and the degree of difficulty while using the machine for better cardiac output. Since, no sudden increases of levels will be generating automatically even if the electric voltage fluctuate as motorised, that directly affect the treadmill. The latter (Electronics Inclination) which is more useful for the body to engage different muscles particularly in the calves, quadriceps, and gluts, increases the aerobic demand of the run helps develop more endurance, and boosts muscular strength, which can help prevent injuries.", also reduces the stress on joints and help target different muscle groups and allow faster calorie burn and support better muscle definition. The increase level on the incline on the treadmill is based on percentage not a level. So the raise the treadmill to 2, it means running at a 2% incline not a level two. The incline increases the number of calories burned. Without an incline, the burning capacity on an average only that of 500 calories. By setting the incline at 15 percent, the calories burning only by 60 percent when running or by 150 percent when walking. However, if the level is increased beyond 15 levels the physiological effect will be more useful to the tread mill user. Some treadmills also have the reversing of a running belt for the purpose of downhill loads with a slope angle of 0 to 20%.

5.11 Display
An LED display (light emitting diode) display is a flat panel display that uses light emitting diodes as the video display. An LED display panel can be either a small display or part of a larger display. LED diodes are used in order to make up an LED display. LED dot matrix display board can be very bright and eye-catching. LED dot matrix produces more light per watt than incandescent bulbs; this is useful in battery powered or energy-saving devices.

5.12 Multimedia Capabilities
This includes 3.5mm Jack Slot, Feedback Incline, Speed, Time, Calorie Pulse and Distance.

5.13 Programs
Treadmill workout ideas different ways to give the treadmill work out a boost and also easier to use and have numerous built-in workout programs that would be a motivation to keep the diseases and calories away. This include preset, user set, manual and self defined programs depended upon the company's of product.

5.14 Safety
If you want to be healthy, it should start with being safe. Accidents can always occur with exercise equipment and the treadmill is no exception. A good treadmill should have good safety features built in. Since, when the change of speed while on a treadmill, the change should happen gradually, not drastically. The magnetic key an important feature to the treadmill with a magnet that attached to a string attach to the body before running. help if in case if exhausted by the user and can't keep up, the key will snap to make the treadmill stop.

6. Conclusion
Motorized treadmills are now a part of every healthy family. With the pace you want, treadmills are real heroes to be burning down calories and laziness. However, one has to inspect all the technical specification specially the motor "since it's the heart of the machine" and its additional unique feature that effect the biomechanical, physiological and the psychological effect and its use towards the training aspects, also ensure the safety, security; economical consumption and quality of the product, so that we "inculcate injury free fitness into our lives for a better us in a better tomorrow".

7. References
1. Major, Kenneth. "The Pre-Industrial Sources of Power: Muscle Power". History Today. 1980 Retrieved June 22, 2012.
2. Thompson, Irene. The A-Z of punishment and torture. Book Guild Publishing, 2008 134. ISBN 978-1-84624-203-8. Archived from the original on 2013-07-30.
3. Luff, Christine. How to Beat Boredom on the Treadmill". About.com., 2009." Retrieved January 22, 2009.
4. "Kinetic and physiological analysis of the GAME Wheels system". Journal of Rehabilitation Research & Development. 2002; 39(6):627-634. November–December
5. https://www.hfe.co.uk/blog/history-of-the-treadmill/