The Use of Pedometers in Medical and Alternative Care Treatment Plans[a]

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[a]**Condensed from, *Restructuring Body Composition: How the kind, not the amount, of weight loss defines a pathway to optimal health,* and with permission from the author, Gilbert R. Kaats.**

In the December 2007 issue of *The Original Internist*, Kessinger points out that medicine and chiropractic have separate foundations, but share the same end goal: "...optimal health for those we have the privilege to serve....Find what works, make sure it works, and then add to it; re-tool one good idea with another. Never take away from what works. Always add to it."[1] In a nutshell, Kessinger has captured the guidelines for deciding the appropriateness of integrating pedometers into medical and alternative care treatment plans.

Find what works. If you ask patients why they don't exercise, the most frequent answer is that they just don't have time. Unfortunately, the lack of time is something that, for most people, never changes, even when they retire. But it's almost impossible to convince patients that their future, even after retirement, will be less time-crowded. Furthermore, recommending or prescribing exercise is something patients have heard time and time again and, although they don't dispute its value for optimizing health, it rarely leads to behavior change. In many cases, the patient's definition of exercise is, as one humorist has put it:

"The art of converting big meals and fattening snacks into back strains and pulled muscles by lifting heavy things that didn't have to be lifted in the first place, or running when no one is chasing you."

So adding exercise into treatment plans can work, but the question is, how does the practitioner convince the patient to exercise? Only a small number will begin to exercise, and even fewer yet will stay with it as a permanent lifestyle change. It's time to re-tool.

After three decades of conducting clinical trials and R & D on health-enhancing products and technologies, it has become increasingly clear that if we are to help people move toward optimal health, we need a strategy to help them get the benefits of exercise by taking only minimal time out of their daily routines. The starting place is to re-frame "exercise" as "physical activity" and focus on what we can do to get patients to move more, not necessarily to exercise more.[2] This is where the pedometer, or the "clicker", as we have come to call it, can make a contribution. It starts by encouraging the patient to simply wear the clicker during their waking hours and observe the number of steps or "clicks" they accumulate in a day.

While it is often recommended that people accumulate a minimum of 10,000 steps a day, it's probably more effective to avoid any goal-setting initially. For many, this constant stream of feedback throughout the day will be a "reality check" and a major wake up call when they realize how short they fall of the daily recommended level.[3] For example, when writing in *Prevention Magazine* about her initial experience in using a pedometer, Cindi Caciolo, a former editor, reported:

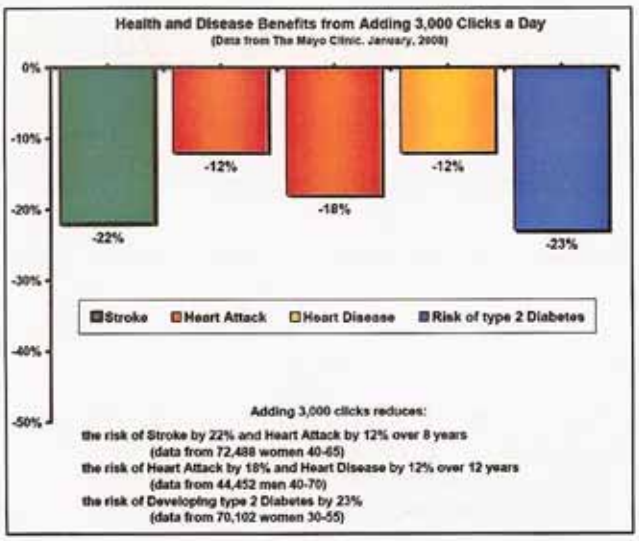
"I remember the first day I wore a pedometer. I was really excited to see how many steps I'd rack up. I was sure I'd hit 10,000 steps by noon. The first day: morning meetings, lunch at my desk, afternoon meetings, make a quick dinner, take the kids to their evening activities, help with homework, do a little housework, and finally, to bed.

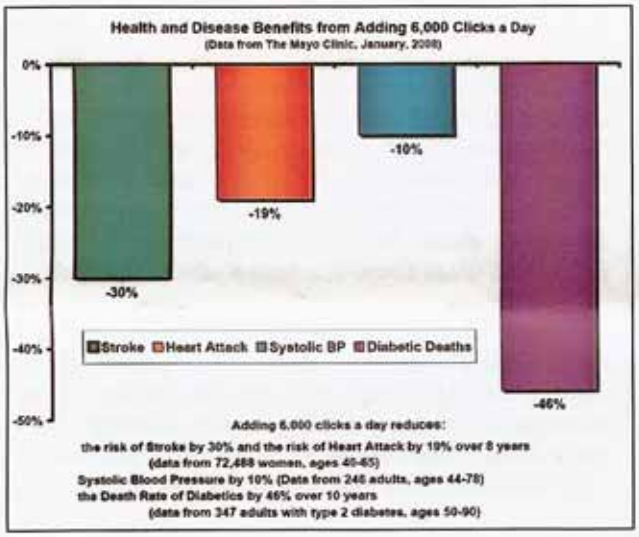
I stared at the pedometer. A mere 4,500 steps! What a reality check! Here I thought I was so active when I was actually (gulp!) sedentary!

The next day I checked my total constantly. I wanted to beat my first day's totals so I found lots of ways to take extra steps. My total for the second day: 8,200 steps. My point? A pedometer can give you a realistic view of how active you are. It can also motivate you to increase your activity level—the key to permanent weight loss."

One of the key points that Caciolo makes is the reality confrontation provided by the constant stream of feedback pedometers provide that that sets the stage for the well-established principle of behavior modification that, "what gets measured gets managed."

While Caciolo is correct that increasing activity levels is the key to permanent weight loss, it can also provide some profound health and disease benefits that go beyond weight loss from a *Mayo Clinic*[4] newsletter below.





As the writer also points out,

"Simply taking the time to move your body in a moderately strenuous way [walking] can lead to enormous benefits...If you can't find time to do a 30-minute—or longer—block of exercise or activity, it's OK to break it up into shorter blocks of 10 minutes or more. The point is to get moving for a total of 30 minutes or more a day. Remember, the point of exercise isn't just to add a few more years to your life. It's about being alive—feeling healthy, getting out and enjoying the world, staying independent and having the vitality to do the things you want to do." [4]

An important feature of wearing the clicker is that people begin to learn how they can increase their click totals without expending much additional time. For example, when the phone rings, most people answer it and proceed to, or remain on, a chair or couch where they can sit down to have their telephone conversation. When accumulating clicks is the goal, people become increasingly aware that they can continue the conversation while pacing or walking around the office or home. The time is going to be spent on the phone call anyway so it is not a question of giving up more time, but rather making use of the time they are spending to multi-task - getting clicks while talking. It just takes a few long phone calls for the user to realize how quickly additional clicks can be accumulated at no time-expense. As one user commented, "Every time my mother calls, its good for 2,000 clicks." They also begin to realize how they can add additional clicks while watching television, by choosing a parking space that is a little further away, etc. Once one starts pacing, the step-clock begins and more calories are burned, more lean is added, and more improvements in bone-health occur.

Simply reviewing one's measured click totals creates the behavior changes. For example, a study conducted at the University of Southern Maine suggests that wearing a pedometer and recording and tracking steps could increase the average subject's daily movement by a whopping 24%! For the average person, that could result in a 5-pound weight loss per year. But physical activity levels increase even more if the user records and tracks daily click totals, and the most change will occur if the user records, tracks and graphs daily click totals. Recording, tracking and graphing is, in itself, a powerful technique for changing behavior.

Make sure it works. How do we make sure that pedometers actually do get people moving more and provide health benefits? Rather than cite a series of studies, the answer can be found in two recent reviews of the effects of pedometer usage. The first review, published in the *Journal of the American Medical Association* in November 2007, reports the results of a research team from Stanford University that concluded that wearing a pedometer can lead to significant increases in physical activity and subsequent health benefits. As the study lead author, Dr. Dena Bravata reported in an interview, *"The device is a great little motivator. I never anticipated such a small intervention could have such a big effect."* [5]

Subsequent to the *JAMA* review, in January 2008 researchers at the University of Michigan published another review in the *Annals of Family Medicine*.[6] These reviewers analyzed nine different studies from which they concluded that people who participate in a pedometer-based walking program can be expected to lose a modest amount of weight even without changing their diet; the longer they stuck with the program, the more weight they lost. Participants increased their daily activity levels by the equivalent of one mile a day and lost an average of almost 3 pounds without changes in diet. The researchers concluded that:

"The amount of weight loss attributable to pedometer-based walking programs is small but important from a clinical perspective. According to the meta-regression results, the average participant adhering to a pedometer-based walking program can expect to lose about 0.05 kg per week. That translates to a weight loss of about 1 lb every 10 weeks. Over a year, participants can expect to lose about 5 lb. Although a 5-lb weight loss for an overweight participant may represent only 2% to 3% of that person's body weight, if the participant continues with the pedometer program and if the rate of weight loss is sustained over several years, the target of 7% of body weight loss used in the Diabetes Prevention Program study could be achieved."[6]

In an interview about the study, the lead investigator, Caroline R Richardson, M.D. commented that,

"While pedometer-based walking programs are thought of as convenient and flexible for participants, there has been some question in the fitness and medical communities about the health benefits of such programs. This analysis should quell some of those questions. The increase in physical activity can be expected to result in health benefits that are independent of weight loss. Increasing physical activity reduces the risk of cardiovascular problems, lowers blood pressure and helps dieters maintain lean muscle tissue when they are dieting. Another benefit," she says, *"is that exercise in general has been shown to improve glucose tolerance in people with impaired glucose tolerance or type 2 diabetes."*[6]

Never take away from what works. Always add to it. The assessment of what works should include an evaluation of which of the pedometers works the best. To some extent, the pedometer the practitioner recommends or markets to his/her patients will make a statement about the practitioner's competence. The cost of a pedometer will only be a very small one-time part of the costs of a treatment plan, so price need not be a consideration, but quality should be. With pedometers, as well as most other things, you get what you pay for. An unreliable pedometer will also undermine the patient's confidence in the measurements and will provide a rationalization not to continue tracking their clicks. The key is to select one that is simple to operate, provides reliable and valid data, and is sturdy enough to survive what is likely to be some hard knocks.

Since we use pedometer measurements of physical activity levels in our clinical trials, we have sought to find the units that meet these criteria. We compared many, but not all. We found the Yamax activity monitor to be the most accurate and reliable of the units we studied. Yamax's units are in a class by themselves, as independent researchers and universities have consistently found them to meet the standards of durability, precision and accuracy that's needed for scientific research. In fact, in studies comparing Yamax pedometers to other units, Yamax's are consistently rated superior. It is backed by Yamax's on-going program of scientific research and comparative studies. There are less expensive pedometers on the market, but as the price goes down, so does the quality. We selected the Yamax pedometer, marketed by HealthTech Products (210.274.6193) for our studies based not on price, but rather on reliability, validity and durability. While this unit provides ongoing measurements of total steps, miles walked and calories expended, it is our experience that people ultimately use only the total steps feature.

Almost two decades after we started using Yamax pedometers, researchers at the University of Tennessee confirmed our initial studies of the unit's accuracy in a study comparing the accuracy of 13 models of pedometers concluding:

"One of the difficulties in assessing pedometer accuracy under free-living conditions is the lack of a 'gold standard'. Although pedometer accuracy can be assessed by counting steps in controlled laboratory experiments, it is not feasible to assess pedometer accuracy in this manner over 24 hours. Therefore, it was decided to use a single pedometer, the Yamax, as the criterion. In controlled laboratory settings, the Yamax pedometers have consistently been shown to be among the most accurate. In addition, the Yamax pedometer is commonly used in applied research....

The Yamax has performed very well in previous validation studies...[and] gave mean step counts that were within 1% of actual steps...[and] was found to have similar accuracy in normal weight, overweight, and moderately obese individuals. [As compared to the Yamax]...large mean error scores were reported between pedometers, ranging from an underestimation of 25% to an overestimation of 45%, for 24-hour data [and] there were several individual occasions where the comparison pedometers gave values that under or overestimated steps by 35-60%."[7]

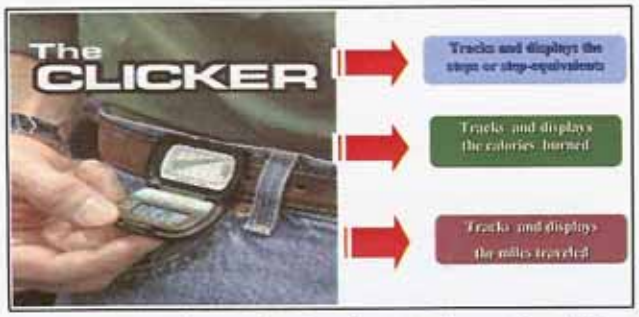
It is also worth noting that this study was an independent study and was not funded by Yamax or any of the other competing pedometer companies.

Getting started—some instructions for patients

1. **Wear It.** Wear the clicker throughout the day and take "snap-shots" of the total clicks throughout the day. The goal is to get more clicks, not necessarily to exercise more or to start a workout program.

2. **Track It.** Use the clicker tracker. At the end of each day, write down the number of clicks and click-equivalents you've accumulated. It's a simple record to keep and you'll be surprised how much (and how effortlessly) you'll start increasing your daily step totals. A sample tracking form is provided later in this article.

3. **Graph It.** Set up your tracking graph. At the end of each week, calculate your average daily click totals and plot this average on the clicker graph. A sample tracking form is provided later in this article.



Wear It. As shown in the picture above, the clicker appears to be upside down, which means it provides the user with a right-side up view of accumulated steps. The unit is most commonly attached to the belt, slacks or skirt approximately in line with the knee cap or the seam on slacks. It must be parallel to the ground; it will not give accurate readings if it is tilted to one side or the other. Some people have found they can wear it on their underclothes (as long as it fits snugly against the body and remains in an upright and parallel position) and some women may also be able to attach it to the center of their brassiere. Where you should wear it will be dictated by where it works best for you. Try out different positions and count the number of steps you take compared to what is displayed on the clicker. Put the clicker on and then reset it just before you start walking. Count your steps, open it up (with it still attached to your body) and compare the registered steps with the counted steps; it should not be more than 5% off. Hint: If you walk 100 steps, you can easily calculate the percentage it is off (if any) in that particular position. Then if that's where you want to wear it, you can calculate the steps at the end of each day by multiplying that percentage by what is displayed. Do this periodically if you wear the clicker in different positions to cross-check the accuracy in that particular position.

Put the clicker on when you first get up in the morning. You'd be amazed how many clicks you can get before you even leave the house. Attach the clicker to your robe or pajamas and transfer it to your clothing when you get dressed for the day. If you change clothes at the end of the day when you get back home, be sure to put the clicker back on and don't remove it until you get into bed at night.

Track It. Simply recording and charting unwanted behavior invariably leads to a positive change in unwanted or desired behavior. Studies have shown that if you persist in a behavior for 2 to 3 weeks, it will soon become a habit and that the longer you persist in that behavior, the stronger the habit will become. But it's always easier to persist in a behavior if things are kept simple. Tracking and charting clicks is just that if you will simply follow the instructions. Start by finding out how much you typically move each day. You'll need to wear the clicker for 3 days from the time you get up in the morning until you go to bed at night. It would be best to make at least one of the days a weekend, since our activity levels typically differ from weekday to weekend. Do not make any changes in your daily activity and let the clicks accumulate without resetting the clicker. At the end of the third day, divide the number of clicks displayed on your clicker by 3 to get the average number of clicks you typically get each day. This is your baseline. The American Association for Retired Persons (AARP) is actively involved in pedometer programs and they report that most people average only between 2,000 and 4,000 clicks a day. Our research suggests that number is closer to 4,500. In either case, that's only about 20 to 45 minutes of movement each day!

On the average, a "normal" walk amounts to about 100 clicks a minute, or 6,000 in an hour. So if your baseline click average is 4,000, this means that you have probably been moving only about the equivalent of 40 minutes throughout the entire day! Remember, your daily click total is calculated from the time you wake up in the morning until you go to bed at night. All clicks count; not just the ones you get when you are actually walking for exercise. The click-equivalents you acquire when engaging in some other form of physical activity while not wearing the clicker need to be counted as well.

Re-tool one good idea with another. The tracking form is an example of one form we have found helpful to track activity levels on a daily, weekly and average basis.

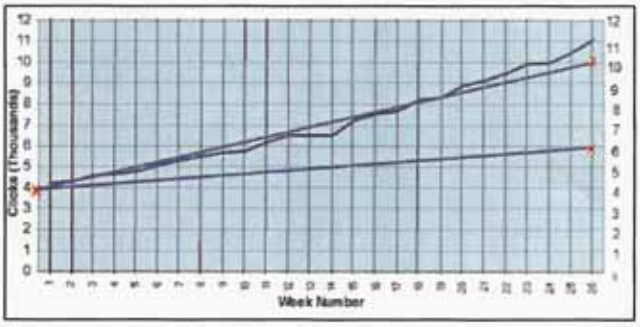
The Clicker Tracker

A	B	C	D	E	F	G	H
Date	Day of Week	# Days	Number of Clicks	Click Equivalents	Total Clicks This Day	Total Clicks This Week	Average Clicks This Week
1-Jan	Wed	1	9,254	1,000	10,254	10,254	10,254
2-Jan	Thu	2	9,000	-	9,000	19,254	9,627
3-Jan	Fri	3	8,000	500	8,500	27,754	9,251
4-Jan	Sat	4	9,000	300	9,300	37,054	9,264
5-Jan	Sun	5	9,000		9,000	46,054	9,211
6-Jan	Mon	6	9,000	450	9,450	55,504	9,251
7-Jan	Tue	7	9,000		9,000	64,504	9,215

Column A: Enter today's date.
Column B: Enter the day of the week.
Column C: Enter the number of days you've been tracking clicks.
Column D: Enter the number of clicks displayed on your clicker.
Column E: Enter any additional clicks from click-equivalent chart.
Column F: Add the clicks in E to those in D and enter the total.
Column G: Add this day's clicks to previous day's total for a running total.
Column H: Divide G by the # Days in C. This is your running average for the week. At the end of day 7, plot that number on your Clicker Graph (see next section). Then start all over tracking the next week!

You can print your own form using this format or build it as a spreadsheet on your computer. However, instead of creating a form, you can contact HealthTech Products (210.274.6193) to see how you can log on to the *Clicker-Tracker Program* which not only tracks your daily clicks, but can provide a personalized clicker tracking program that calculates suggested individualized goals, tracks daily averages and running totals, creates a tracking graph, and provides comparisons of your click totals with established norms. It also provides a way to calculate "click-equivalents" for those times when you cannot (e.g., swimming) or do not want to wear the clicker. You simply identify the activity in which you've engaged and enter the number of minutes you engaged in that activity and the computerized program does the rest and adds it to your daily totals.

Graph It. If you don't log on to the *Clicker-Tracking Program*, you can create your own tracking graph by following the instructions.



The woman in this example was averaging 4,000 clicks a day before starting the program. She and her doctor decide to increase her daily clicks by a minimum of the extra 2,000 clicks recommended by Secretary Thompson. She placed an "x" on the vertical line on the left hand side of the chart at 4,000 clicks, her baseline. She then placed an "x" on her minimum goal of 6,000 a day (4,000 plus 2,000) on the vertical line on the right-hand side of the graph, and a second "x" on her maximum goal of 10,000 on that same vertical line. She then drew two lines connecting her baseline to her minimum and maximum goals. After each week on the program, she plotted her average daily clicks as recorded on her clicker tracker, and drew a line connecting the previous week's average. As you can see, she successfully and gradually increased her weekly average clicks to more than 10,000 over the 26 week period. The clicker-goal curves provide you with a graphic representation that enables you to evaluate your progress over the weeks. Plotting your weekly average clicks keeps you informed of whether you are ahead or behind "the curve." Remember, the Clicker-Tracking Program requires three things: wearing the clicker, tracking your clicks and graphing your weekly totals.

Personalizing your Clicker. This pedometer does have a few additional features that you may (or may not) want to take advantage of, for instance, miles accumulated and calories burned.

Helpful Hints and Repairs.

- Enter your telephone number inside the cover in case you lose it and someone finds it. People really do call.
- Pay careful attention when putting it on and taking it off to avoid breaking the plastic clip, particularly on a thick belt.
- Safety straps with a metal clip are available so that you can attach it to your waistband or belt to prevent the clicker from being knocked off.
- If the clicker gets wet, open it up immediately, remove the battery and use a blow-dryer on the inside mechanisms. Follow the instructions specified earlier on how to put the battery back in. If you want to record calories used and miles accumulated, you will have to re-set your stride length and weight after the battery is replaced.
- If the numbers freeze up or display unreadable numbers, hold down all three buttons at the same time for about 6 seconds, then release. The correct numbers should reappear and the unit will start working normally again.

In Summary

Traditional medicine and alternative care practitioners share the same goals of helping patients achieve optimal health. Pedometer-based tracking programs provide a practical and simple way for patients to improve treatment outcomes based on a well-established behavior modification principle that what gets measured gets managed, what gets measured and tracked gets managed even better, and what gets measured, tracked and graphed gets managed best of all. This article has attempted to encourage practitioners to integrate pedometers into their practice by providing the scientific evidence that pedometers can work and do work, and by providing practical and specific information on how to increase the benefits of pedometer usage. It is something that works and works well, and can enhance the health benefits from a wide range of treatment plans.

About the authors

Gilbert R. Kaats, PhD. Dr. Kaats if a Fellow of the American College of Nutrition and the American College of Sports Medicine; and a Fellow, Diplomate and Member of the Clinical Nutrition Advisory Board of the American Association of Integrative Medicine.

Dr. Kaats has been conducting clinical trials and research and development on health-enhancing products and technologies for the past 32 years. He has amassed a national database containing over 22,000 DEXA measurements of total body composition (lean, fat and bone density). Many of these subjects in the database also have corresponding measurements of a 43-panel blood test as well as pedometer-based physical activity levels and self-reported quality of life inventories. Much of this work is summarized in his recent book, *Restructuring Body Composition: How the Kind, Not the Amount, of Weight Loss Defines a Pathway to Optimal Health*. Taylor Publishing, Dallas, Texas, 2008. Although not involved with the marketing of pedometers, his book is available for sale for $29.95 (210.824.4200). Dr. Kaats is currently CEO/President of Integrative Health Technologies, a public company trading under the symbol IHTI. For more information, see the Company's website, www.ihtglobal.com.

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Samuel C. Keith is IHTI's CIO and has been intimately involved in all research and compilation of the database.

Patti L. Keith is IHTI's Clinical Research Coordinator and has been with the Company for over 20 years supervising clinical trials and research and development.

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