JULIANA GOMES ZABATIERO

COMPARAÇÃO ENTRE DUAS ESTRATÉGIAS QUE SE UTILIZAM DE PEDÔMETROS PARA COMBATER A INATIVIDADE FÍSICA EM TABAGISTAS

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Dissertação apresentada ao Programa de Pós-Graduação em Ciências da Reabilitação (Programa Associado entre Universidade Estadual de Londrina [UEL] e Universidade Norte do Paraná [UNOPAR]), como requisito parcial à obtenção do título de Mestre em Ciências da Reabilitação.

Orientador: Prof. Dr. Fábio Pitta

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DEDICO

Dedico este trabalho à minha família, que em todos os momentos foi fonte de inspiração, força e incentivo para a realização desse nosso sonho.

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If it's a broken part, replace it
If it's a broken arm then brace it
If it's a broken heart then face it

And hold your own
Know your name
And go your own way

And everything will be fine.

Details In The Fabric (Jason Mraz)

ZABATIERO, Juliana Gomes. **Comparação entre duas estratégias que se utilizam de pedômetros para combater a inatividade física em tabagistas**. 2012. 60 f. Trabalho de Conclusão de Curso do Programa de Pós-Graduação em Ciências da Realbilitação (Programa Associado entre Universidade Estadual de Londrina [UEL] e Universidade Norte do Paraná [UNOPAR]) – Universidade Estadual de Londrina, Londrina, 2011.

RESUMO

Introdução: É recomendado que adultos realizem pelo menos 10000 passos/dia para atingir as diretrizes de saúde pública sobre a quantidade mínima de atividade física na vida diária (AFVD). Esse ensaio clínico aleatorizado cruzado comparou os efeitos de dois diferentes protocolos de 5 meses que utilizaram pedômetros e cartilhas informativas para aumentar a AFVD em tabagistas aparentemente saudáveis que atingem ou não 10000 passos/dia na vida diária. **Métodos:** Todos os sujeitos tiveram seu nível de AFVD (passos/dia) avaliado inicialmente (A1), e foram alocados aleatoriamente para um de dois grupos: cartilha+pedômetro (GC+P; n=13), que recebeu uma cartilha com orientações para andar o máximo possível no dia-a-dia por 1 mês; e pedômetro+cartilha (GP+C; n=18) que utilizou um pedômetro todos os dias por 1 mês com o objetivo de atingir como meta 10000 passos/dia. Reavaliação da AFVD foi então realizada (A2), e as intervenções foram cruzadas por um período de 1 mês, seguido de reavaliação da AFVD (A3). Após A3, ambos os grupos utilizaram pedômetros por 3 meses com o objetivo de atingir a meta de 10000 passos/dia, e foi realizada avaliação final da AFVD (A4). Todas as avaliações de AFVD foram realizadas com um pedômetro, utilizado por 6 dias consecutivos. Para análise, cada grupo foi subdividido de acordo com o nível inicial de AFVD em fisicamente ativos ou fisicamente inativos, de acordo com terem atingido ou não 10000 passos/dia na avaliação basal (A1). **Resultados:** Os subgrupos fisicamente ativos do GC+P e GP+C não mostraram mudança nos passos/dia durante o protocolo. O subgrupo fisicamente inativo do GP+C aumentou significativamente os passos/dia na A2 e manteve esse aumento até A4. Padrão similar foi observado no subgrupo fisicamente inativo do GC+P, embora em menor extensão, pois o aumento nos passos/dia atingiu significância estatística limítrofe ($p=0.06$) em A2 e A3 e aumento significante apenas em A4 ($p=0.02$). Δ(A4-A1) foi similar entre os subgrupos fisicamente inativos do GC+P e GP+C ($p=0.43$). **Conclusões:** Ambas as estratégias foram efetivas após 5 meses para aumentar o número de passos/dia em tabagistas fisicamente inativos, apesar do aumento ser obtido mais rapidamente em tabagistas submetidos ao uso de pedômetro como primeira intervenção.

Palavras-chave: Tabagismo. Atividade motora. Locomoção. Panfletos.

ZABATIERO, Juliana Gomes. **Comparison of two strategies using pedometers to counteract physical inactivity in smokers**. 2012. 60 p. Trabalho de Conclusão de Curso do Programa de Pós-Graduação em Ciências da Realbilitação (Programa Associado entre Universidade Estadual de Londrina [UEL] e Universidade Norte do Paraná [UNOPAR]) – Universidade Estadual de Londrina, Londrina, 2011.

ABSTRACT

Background: It is recommended that adults perform at least 10000 steps/day in order to meet the public health recommendations of minimum physical activity in daily life (PADL). This randomized cross-over trial compared the effects of two different 5-month protocols which used pedometers and informative booklets to increase PADL in apparently healthy smokers who reach or not 10000 steps/day in daily life. **Methods:** All subjects had their level of PADL (number of steps/day) assessed at baseline (A1), and were then randomly assigned to one of the two groups: booklet+pedometer (GB+P; n=13), which received a booklet with encouragement to walk as much as possible in everyday life for 1 month; and pedometer+booklet (GP+B; n=18) which wore a pedometer every day during 1 month aiming to achieve a 10000 steps/day target. Reassessment of PADL was then performed (A2), and the interventions were crossed-over for a 1-month period, followed by reassessment of PADL (A3). After A3, both groups used pedometers every day for 3 months aiming to reach the 10000 steps/day target, and final assessment of PADL was performed (A4). All PADL assessment points were performed with a pedometer worn for 6 consecutive days. For the analysis, each group was subdivided according to their baseline PADL as physically active or physically inactive, according to have reached or not 10000 steps/day at baseline (A1). **Results:** The physically active subgroups of GB+P and GP+B showed no change in steps/day throughout the protocol. The physically inactive subgroup of GP+B significantly increased steps/day at A2 and maintained this increase until A4. Similar pattern was observed in the physically inactive subgroup of GB+P, although to a lesser extent since increase in steps/day reached borderline statistical significance ($p=0.06$) at A2 and A3 and statistically significant increase only at A4 ($p=0.02$). Δ(A4-A1) was similar between the physically inactive subgroups of GB+P and GP+B ($p=0.43$). **Conclusions:** Both strategies were effective in increasing the number of steps/day after 5 months in physically inactive smokers, although the increase was more quickly observed in smokers submitted to the use of the pedometer as the first intervention.

Key words: Smoking. Motor activity. Locomotion. Pamphlets

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LISTA DE ABREVIATURAS E SIGLAS

6MWT	6-minute walking test
ACSM	American College of Sports Medicine
Act	Active
BDI	Beck Depression Inventory
BMI	Body Mass Index
BP	Bodily Pain
Cig/Day	Number of cigarettes per day
COPD	Chronic Obstructive Pulmonary Disease
DPOC	Doença Pulmonar Obstrutiva Crônica
ERF	Emotional Role Functioning
FEV_1	Forced expiratory volume in the first second
FEV_1/FVC	Forced expiratory volume in the first second and forced vital capacity ratio
FTQ	Fagerström Tolerance Questionnaire
GB+P	Group Booklet+Pedometer
GC+P	Grupo Cartilha+Pedômetro
GHP	General Health Perceptions
GP+B	Group Pedometer+Booklet
GP+C	Grupo Pedômetro+Cartilha
IMC	Índice de Massa Corpórea
Inact	Inactive
LFIP	Laboratório de Pesquisa em Fisioterapia Pulmonar
MH	Mental Health
OMS	Organização Mundial da Saúde
Pack/Years	Pack/Years Index
PADL	Physical Activity in Daily Life
PF	Physical Functioning
PRF	Physical Role Functioning
SF-36	Medical Outcomes Study 36-Item Short Form Health Survey
SRP	Social Role Functioning
STAIT-T	State-Trait Anxiety Inventory
UEL	Universidade Estadual de Londrina
Vit	Vitality
WHO	World Health Organization

SUMÁRIO

1 INTRODUÇÃO

A Organização Mundial de Saúde (OMS) define o tabagismo como uma doença crônica gerada pela dependência da nicotina, sendo a principal causa de morte evitável. A cada ano o tabagismo mata aproximadamente 6 milhões de pessoas e causa dano econômico de centenas de bilhões de dólares em todo o mundo[1]. Concomitantemente, sabe-se que a atividade física regular pode prevenir ou atrasar o aparecimento de diferentes doenças crônicas[2]. Desta forma, a inatividade física aliada ao tabagismo tem um papel importante no desenvolvimento de morbidades e nas taxas de mortalidade.

Garcia-Aymerich et al.[3] mostraram que em tabagistas, a atividade física regular está associada com declínio da função pulmonar menos pronunciada ao longo do tempo, e conseqüentemente com menor risco de desenvolvimento de doença pulmonar obstrutiva crônica (DPOC). Nesse contexto, a importância da promoção da prática de atividade física regular em tabagistas tem sido destacada na literatura[4;5].

O *American College of Sports Medicine* (*ACSM*) orienta, em diretrizes de saúde pública a respeito da atividade física, que o mínimo de 30 minutos de atividade física diária de intensidade moderada é necessário para a manutenção ou para o desenvolvimento da aptidão física[2]. Em estudo utilizando pedômetros para incentivar o aumento da atividade física na vida diária, Tudor-Locke et al. mostraram que indivíduos que atingem 10000 passos por dia geralmente atingem o nível mínimo de 30 minutos por dia de atividade física moderada recomendado[6]. Visto que fatores de risco como o tabagismo potencializam os riscos da inatividade física, a realização de atividade física regular deve ser incentivada e promovida em tabagistas.

Dentre as ações para estimular o aumento da atividade física, destaca-se o uso de pedômetros para o incentivo e monitoração do número de passos por dia. Pedômetros são aparelhos pequenos, simples e de baixo custo que quantificam a atividade física por meio da contagem dos passos realizados por um indivíduo em um determinado período de tempo[7]. Nos últimos anos, estudos têm sido desenvolvidos em diversas populações utilizando tais aparelhos não apenas para monitorar o número de passos que o indivíduo realiza em seu dia-a-dia, mas também como ferramenta de incentivo para o aumento da atividade física[8-15].

Especificamente em tabagistas, Kovelis et al.[16] recentemente mostraram os benefícios a curto prazo (1 mês) da utilização de dois instrumentos motivacionais para incentivo à atividade física para essa população: uma cartilha informativa e o pedômetro. Os autores concluíram que tabagistas fisicamente inativos aumentaram sua atividade física diária quando submetidos a um protocolo simples de 1 mês que usou pedômetros. Além disso, os tabagistas menos ativos antes do protocolo foram os que mais aumentaram a atividade física diária. Por outro lado, os resultados atingidos com o uso da cartilha informativa foram menos pronunciados e não estatisticamente significantes.

Estes resultados preliminares qualificam o pedômetro como uma ferramenta promissora para estudos envolvendo a melhora da saúde dessa população. No entanto, não há evidências do efeito a médio prazo da utilização de pedômetros e cartilhas informativas como incentivo para aumentar a atividade física em tabagistas. Adicionalmente, o estudo de Kovelis et al.[16] não mostrou o efeito aditivo da cartilha informativa como adjunta ao uso de pedômetros. Portanto, o presente estudo é uma continuação do estudo preliminar de Kovelis et al.[16] e teve como objetivo analisar os efeitos de dois protocolos de 5 meses que se utilizaram de pedômetros e cartilhas informativas para incentivar o aumento da atividade física diária em tabagistas que atingem ou não a recomendação mínima de 10000 passos/dia. Secundariamente, objetivou-se estudar os efeitos dos protocolos na qualidade de vida relacionada à saúde, sintomas de ansiedade e depressão, grau de dependência nicotínica e hábitos tabagísticos.

2 REVISÃO DE LITERATURA – CONTEXTUALIZAÇÃO

2.1 TABAGISMO

Segundo a OMS, o tabagismo é a causa líder de morte evitável globalmente, mata cerca de 6 milhões de pessoas e causa dano econômico de centenas de bilhões de dólares a cada ano. Se as tendências atuais permanecerem, em 2030 o tabaco matará mais de 8 milhões de pessoas em todo o mundo a cada ano, com 80% destas mortes prematuras entre pessoas vivendo em países de baixa e média renda[1].

Em 2006, em pesquisa realizada pela Secretaria de Vigilância em Saúde do Ministério da Saúde do Brasil, foi encontrada prevalência de 16,4% de fumantes atuais na população adulta de 18 ou mais anos de idade (12,6% em mulheres e 20,9% em homens)[17]. Apesar da redução lenta do tabagismo, principalmente entre os homens, em países industrializados, verificou-se nas últimas décadas um aumento drástico do fumo nos países em desenvolvimento, especialmente entre jovens e mulheres[18].

O tabagismo é amplamente reconhecido como doença crônica causada pela dependência da nicotina. O usuário de produtos derivados do tabaco é exposto a mais de 4700 substâncias tóxicas presentes na composição da fumaça do tabaco. Existem evidências de que a dependência nicotínica, assim como o fumo passivo, estão relacionados ao desenvolvimento de diversas doenças, a maioria fatais, como diversos tipos de cânceres, doenças cardiovasculares e respiratórias[19].

O tabagismo ativo coloca o indivíduo em maior risco de desenvolvimento de doença pulmonar obstrutiva crônica (DPOC) do que qualquer outro fator de risco isolado. No mundo, de 80 a 90% dos casos podem ser atribuídos à história tabágica. Além disso, a DPOC é comumente acompanhada de outras comorbidades relacionadas ao tabaco, tais como câncer e doenças cardiovasculares[20].

Os principais efeitos da fumaça do cigarro sobre o sistema respiratório são a inflamação (principal mecanismo envolvido na gênese da DPOC) e os efeitos mutagênicos/carcinogênicos; seus componentes exercem efeitos irritativos e tóxicos à via aérea, podendo levar à inflamação local, além de lesão ou morte celular. Estas substâncias podem ainda causar diminuição na capacidade de

limpeza das vias aéreas, que resulta em aumento da produção e retenção de muco. Estas últimas alterações podem levar à colonização e infecção das vias aéreas e resultar em exacerbações inflamatórias[21].

Desde 1950 foi estabelecida a relação entre tabagismo e câncer de pulmão e, mais recentemente também foi estabelecida a relação com neoplasias em outras estruturas, tais como laringe e esôfago. Apesar do papel da fumaça ambiental na etiopatogenia do câncer ser complexa, já foram identificadas entre 60 a 80 substâncias cancerígenas dentre os mais de 4700 componentes da fumaça do tabaco[21].

Dentre os efeitos deletérios do tabagismo no sistema cardiovascular são conhecidos: a aceleração do processo de envelhecimento das artérias com aparecimento da aterosclerose precoce; hipóxia tecidual causada pela associação do monóxido de carbono presente na fumaça do tabaco e a hemoglobina, que resulta em lesões progressivas das paredes dos vasos, tornando-os mais rígidos; e a ação vasoconstritora da nicotina, que diminui ainda mais o aporte de oxigênio para a periferia. Além disso, o fumo pode causar aumento agudo da pressão arterial em aproximadamente 5 a 10 mmHg acima do seu valor basal, que pode resultar em aumento da resistência vascular sistêmica e predispor a acidentes vasculares cerebrais, angina, infarto do miocárdio e morte súbita[21].

Indivíduos que deixam de fumar antes dos 50 anos de idade apresentam uma redução de 50% no risco de morte por doenças relacionadas ao tabagismo após 16 anos de abstinência, quando comparados com indivíduos que continuam a fumar. Após 10 anos sem fumar, o risco de morte por câncer de pulmão sofre redução de 30 a 50% em ambos os sexos; e o risco de doenças cardiovasculares cai pela metade após um ano de abstinência tabágica[22].

Em pesquisa nacional sobre o tabagismo, realizada no ano de 2009, 45,6% dos tabagistas fizeram tentativa de parar de fumar; destes, 6,7% utilizaram medicamentos e 15,2% utilizaram aconselhamento de profissional. Tais dados demonstram que a conscientização do profissional de saúde sobre a importância da valorização do tratamento do fumante deve ser estratégia fundamental no controle do tabagismo, especialmente em países em desenvolvimento, como o Brasil, onde é esperada a maioria de mortes relacionadas ao tabaco nos próximos anos[1,23].

2.2 ATIVIDADE FÍSICA

A Atividade Física é definida como qualquer movimento corporal produzido pelos músculos esqueléticos que resulta em gasto energético maior do que os níveis de repouso[24].

A atividade física regular e exercício estão associados a inúmeros benefícios à saúde física e mental em adultos. A mortalidade por todas as causas é atrasada pela prática de atividade física, e o mesmo ocorre quando um indivíduo muda de um estilo de vida sedentário ou com nível insuficiente de atividade física para um nível onde as recomendações mínimas são atingidas[2].

O sedentarismo é tido como problema mundial de saúde pública. De acordo com estatísticas norte-americanas, um estilo de vida sedentário contribui para a maior ocorrência de mortes por doenças crônicas, incluindo doenças coronarianas, infarto agudo do miocárdio e alguns tipos de câncer, perdendo somente para o hábito de fumar e obesidade[25;26].

Os benefícios advindos da prática de atividade física regular estendem-se a diferentes aspectos físicos e mentais. A atividade física diminui a pressão sanguínea; aumenta o volume sistólico; aumenta a potência aeróbica; aumenta a ventilação pulmonar; melhora o perfil lipídico, os níveis de proteína C-reativa, e outros marcadores de doenças cardíacas crônicas; melhora a sensibilidade à insulina e diminui a freqüência cardíaca em repouso e o trabalho submáximo[2;27]. Além disso, resulta em diminuição da gordura corporal, incremento da força e da massa muscular, da densidade óssea e da flexibilidade. No âmbito psicológico, a atividade física atua na prevenção e melhora de disordens depressivas moderadas e ansiedade, assim como na melhoria da auto-estima, do auto conceito, da imagem corporal, das funções cognitivas e de socialização e na diminuição do estresse[27;28].

Estudos mostram que benefícios significativos para a saúde já podem ser obtidos com atividades de intensidade relativamente baixa, comuns no cotidiano, como andar, subir escadas, pedalar e dançar. Portanto, tais atividades também devem ser orientadas e incentivadas, além dos programas formais de exercícios físicos[29;30].

As mais recentes diretrizes de saúde pública a respeito da atividade física publicadas pelo *American College of Sports Medicine* (ACSM) recomendam a

realização de no mínimo trinta minutos de atividades físicas de intensidade moderada por dia, em cinco ou mais dias da semana, desenvolvidas continuamente ou mesmo em períodos cumulativos de 10 minutos, para o total de 150 minutos ou mais de atividade física por semana para a manutenção ou para o desenvolvimento da aptidão física. Indivíduos que não atingem estes padrões mínimos são considerados insuficientemente ativos e apresentam um maior risco de morbi-mortalidade[2].

Uma maneira de se quantificar objetivamente a atividade física de vida diária é por meio da avaliação do número de passos realizados por dia, que pode ser realizada com a utilização de pedômetros. Pedômetros são aparelhos simples, pequenos e de baixo custo que contam os passos realizados por um indivíduo num determinado período de tempo. Tais instrumentos são úteis para a implantação de programas para promoção do aumento da atividade física diária utilizando uma quantidade mínima de passos/dia como meta a ser alcançada[31]. Estudos mostram que indivíduos que perfazem 10000 passos por dia atingem o nível mínimo de 30 minutos por dia de atividade física moderada como recomendado pelo ACSM[6]. Com base nisso, diferentes programas utilizando pedômetros e metas de número de passos a serem alcançados por dia, com o objetivo de aumentar a quantidade de atividade física diária foram aplicados com sucesso em diversas populações, como indivíduos com hipertensão arterial[32], síndrome coronariana aguda[15], diabetes mellitus[10], osteoartrite de joelho[14], adolescentes inativos[11] e indivíduos sedentários no ambiente de trabalho[12;13].

O estilo de vida sedentário aumenta as taxas de morbi-mortalidade, e o papel da atividade física regular na prevenção ou adiamento do aparecimento de diferentes doenças crônicas é atualmente reconhecido[2]. Portanto, o aumento da atividade física de qualquer população contribui decisivamente para a saúde pública, com forte impacto na redução dos custos com tratamentos de saúde[29].

2.3 Relação entre Tabagismo e Inatividade Física

Em estudo de Trisltz *et al*.[33], indivíduos tabagistas apresentaram diminuição significativa da tolerância ao esforço, quando avaliados pelo teste da caminhada de seis minutos, sendo importante a interrupção do tabagismo e a introdução destes indivíduos em programas de condicionamento físico. Além disso,

tabagistas apresentam risco cerca de 50% maior de serem sedentários nos períodos de lazer quando comparados a não tabagistas[34]. Em uma revisão sistemática com o objetivo de investigar a relação do tabagismo e a inatividade física, 50 artigos que estudavam tal relação foram reunidos e quase 60% deles relataram associação negativa entre o tabagismo e a atividade física, mostrando que o individuo com maior consumo tabágico apresenta menor quantidade de atividade física diária[35].

O uso de orientação para a prática de exercícios físicos durante a tentativa de cessação tabagística mostrou-se capaz de aliviar sintomas de abstinência nicotínica, o que torna tal prática recomendável[4;36]. Todavia, ainda não existe evidência suficiente de benefício em médio e longo prazo de protocolos objetivando o aumento da atividade física de vida diária em tabagistas aparentemente saudáveis[37].

3 ARTIGO:

COMPARISON OF TWO STRATEGIES USING PEDOMETERS TO COUNTERACT PHYSICAL INACTIVITY IN SMOKERS

(Formatado de acordo com as normas de submissão do periódico American Journal of Physical Medicine and Rehabilitation)

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ABSTRACT: Objective: To compare the effects of two different 5-month protocols using pedometers and informative booklets to increase physical activity in daily life (PADL) in smokers who reach or not 10000 steps/day in daily life. **Design:** PADL level was assessed at baseline (A1), and subjects were randomly assigned to groups: booklet+pedometer (GB+P; n=13), which received a booklet with encouragement to walk as much as possible in everyday life; or pedometer+booklet (GP+B; n=18) which wore a pedometer aiming to achieve 10000 steps/day; both for 1 month. PADL was re-assessed (A2), and the interventions were crossed-over for 1 month, followed by PADL reassessment (A3). After A3, both groups used pedometers for 3 months aiming to reach 10000 steps/day, and final PADL assessment was performed (A4). For the analysis, each group was subdivided according to baseline PADL as physically active or inactive, according to have reached or not 10000 steps/day at baseline. **Results:** The physically active subgroups of GB+P and GP+B showed no change in steps/day. The physically inactive subgroup of GP+B significantly increased steps/day at A2 and maintained this increase until A4. Similar pattern occurred in the physically inactive subgroup of GB+P, although to a lesser extent since increase in steps/day reached borderline statistical significance (p=0.06) at A2 and A3 and statistically significant increase only at A4 (p=0.02). **Conclusions:** Both strategies were effective in increasing the number of steps/day in physically inactive smokers after 5 months, although the increase was more quickly obtained in smokers who used pedometers as the first intervention.

Key words: Smoking. Motor activity. Locomotion. Pamphlets

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Introduction

The World Health Organization (WHO) defines smoking as a chronic disease caused by nicotine dependence, and reports it as the leading cause of preventable death[1]. Concomitantly, it is known that regular physical activity can prevent or delay the onset of different chronic diseases[2]. Thus, physical inactivity combined with smoking is believed to have an important role in morbidity and mortality rates.

A study by Garcia-Aymerich et al.[3] showed that, in smokers, regular physical activity is associated with lower decline of lung function over time and therefore, lower risk of developing chronic obstructive pulmonary disease (COPD). In recent years, the importance of promoting regular physical activity in smokers has been highlighted in the literature[4;5].

According to public health guidelines regarding physical activity published by the American College of Sports Medicine (ACSM), a minimum of 30 minutes of moderate-intensity physical activity is necessary to maintain or develop physical fitness. Individuals who do not meet these minimum standards are considered insufficiently active and have a higher risk of morbidity and mortality. In addition, the association with other risk factors such as smoking increases even more the negative effects of physical inactivity[2].

Among the actions to promote the increase of daily physical activity, the use of pedometers has recently emerged. By using pedometers, Tudor-Locke et al.[6] showed that those individuals who perform 10000 steps/day approach the minimum recommendation of the ACSM. Pedometers are small, inexpensive and simple devices which count the steps taken by an individual over a period of time[7]. These devices have been used not only to quantify the number of steps performed in the day-by-day life, but also as a tool to promote and stimulate the increase of physical activity levels in several populations[8-15].

Specifically in smokers, our research group recently studied the short-term benefits of two motivational tools used to promote physical activity in this population: pedometers and informative booklets[16]. It was concluded that physically inactive smokers using a pedometer with a target of performing at least 10000 steps/day significantly increased their number of steps/day after 1 month. In addition, improvement was inversely related to the baseline activity level, in a way that those smokers with a very low level of activity before the protocol were the ones which increased the most their daily physical activity by using the pedometer. On the other hand, the benefit of the informative booklet was much less pronounced and not statistically significant. These preliminary results qualified the pedometer as an effective short-term tool for improving daily physical activity in inactive smokers. However, despite being a promising tool, the magnitude of its benefits was not yet studied in longer-lasting interventions. In addition, our preliminary study (published by Kovelis et al.[16]) was not able to provide information on the added value of the informative booklet as an adjunct to the pedometer intervention.

Therefore, the present investigation is the continuation of our preliminary study[16] and aimed to compare the effects of two different 5-month protocols which used both pedometers and informative booklets to increase PADL in apparently healthy smokers who reach or not 10000 steps/day in daily life. Additionally, we also aimed to study the effects of the protocol on smoking habits, degree of nicotine dependence, health related quality of life and symptoms of anxiety and depression.

Methods

Recruitment

The smokers included in the study were recruited by the current researchers through advertisements in the media, buses and health centers. The announcement invited asymptomatic or mildly symptomatic smokers, of both genders and over 18 years old to participate in a program of physical activity promotion at the ---------- -- -------- -- ---------- ---------- (----) of ---------- -------- -- -------- (---), .

Inclusion criteria were: 1) current smokers (regardless of duration of smoking) of both genders, over 18 years old; 2) normal spirometry (*i.e.*, without spirometric alterations); 3) absence of pathological conditions which could influence the performance of physical activities in daily life (e.g., cerebrovascular, rheumatic or orthopedic disease). Exclusion criteria were: 1) inability to understand or cooperate with the application of questionnaires and other tests, 2) lack of availability or will to attend the follow-up assessments; 3) initiation of medical treatment which compromised the subject's performance of daily physical activity. The study was approved by the --- Ethics Committee in Research, and data were collected from June 2008 to September 2010 at the aforementioned research laboratory. All subjects signed an informed consent term prior to their inclusion in the study.

Study design and subjects

The smokers who fulfilled the inclusion criteria were submitted to an initial assessment (A1) that included tests of lung function, nicotine dependence and smoking habits, health related quality of life, levels of anxiety and depression, besides the quantification of daily physical activity with a pedometer (steps/day). The 6-minute walking test (6MWT) was assessed for baseline comparison of functional capacity between the groups. The methodology involved in the tests is described in more details below.

The design of this randomized cross-over study is depicted in figure 1. Randomization was performed through blocks of 10 opaque concealed envelopes. Allocation and

random sequence were generated by a researcher not involved in the present study, whereas assignment to the interventions was done by the current researchers.

After A1, subjects were then randomly assigned to one of the two groups: booklet+pedometer (GB+P), which initially received a booklet (ANEXO B) with encouragement to walk as much as possible in everyday life for 1 month; and pedometer+booklet (GP+B), which was initially instructed to wear a pedometer every day during 1 month aiming to achieve a 10000 steps/day target. The GP+B was also provided with a logbook (ANEXO C) to record the number of steps/day performed during this 1-month period. After this initial 1-month period, reassessment (A2) was then performed with the same procedures as A1, and the interventions were crossed-over for another 1-month period. A similar reassessment period (A3) followed, and immediately after that both groups wore pedometers every day for 3 months aiming to reach the 10000 steps/day target. The subjects were also provided with a logbook in order to record the daily number of steps during this 3-month period. After these 3 months, final reassessment was performed (A4) with the same procedures as the earlier assessment points. Assessment points (A1 to A4) lasted for 1 week: 6 days of activity monitoring and 1 day to perform all the other tests.

GB+P subjects received a booklet containing information about the benefits of physical activity and encouragement to walk as much as possible in daily life during the next month, however with no written control of their physical activity. It was self-explanatory, including pictures and simple tips on how to increase physical activity in daily life, such as: taking the staircase instead of the elevator; giving preference to walk rather than drive when shopping or going somewhere closer to home; walking the dog more often; taking advantage of spare time and weekends not only to rest but also for walking and hiking, instead of standing in front of the television for a long time. When delivering the booklet to the subjects, researchers read only parts of it where the importance of physical activity was highlighted, and subjects were instructed to read it on their own during the period of one month and turn the tips into proposals of change of daily habits.

GP+B subjects were instructed to use a pedometer throughout the day for a period of one month, in order to achieve the minimum of 10000 steps/day as a target. Subjects were provided with a logbook and instructed to record the number of daily steps achieved by the end of each day, as well as any information they judged necessary about their daily physical activity. The accuracy of all pedometers used in the study was assured prior to the study onset.

For the analysis, each group was subdivided into two subgroups according to their baseline level of physical activity in daily life (number of steps/day): physically active (subjects who achieved a daily average of 10000 steps/day at baseline [A1]); or physically inactive (subjects who did not achieve this daily average at baseline).

Assessment Methods

Lung function assessment (spirometry)

Spirometry was performed using the SpirobankG (MIR, Italy) spirometer, according to the American Thoracic Society and European Respiratory Society guidelines[17]. Reference values were those from the Brazilian population[18].

Functional exercise capacity assessment

The 6-minute walking test (6MWT) was carried out according to international standards[19] in a 30 meter corridor. Two tests were performed with at least 30 minutes of interval, and the highest value was used for analysis. The reference values were those from Gibbons et al.[20]

Assessment of physical activity in daily life

The level of daily physical activity was assessed with the pedometer Yamax Digiwalker SW-200 (Yamax Inc., Japan), through 6 days of monitoring, from Sunday to Friday. This pedometer model has been extensively tested by different researches and has been considered one of the most reliable step counters available in the market[21;22].

The subjects were instructed to place the device at the right side of the waist just after waking up and reset it, whereas they removed it just before bedtime. In addition, subjects were instructed to remove the device only when extremely necessary or when performing water activities; and to avoid manipulating any part of the instrument at any time during the day at risk of losing data. Along with the pedometer, subjects received a logbook where they reported the time they started wearing the device in the morning, the time they removed it in the evening and the number of steps on its display at the end of the day. In the logbook the subject also reported if the pedometer was removed during the day, for how long and why. The daily physical activity level was determined by the average of the 6 days of assessment, according to the logbook data.

Smoking habits

Subjects answered a questionnaire about their smoking habits, *i.e.*, number of cigarettes/day and time since started smoking. From these data the pack-years index was calculated (number of total years of smoking multiplied by the number of packs smoked per day).

The degree of nicotine dependence was assessed by the Fagerström Tolerance Questionnaire[23;24], a simple and quickly applied instrument, consisting of six items. The test score

classify nicotine dependence into five levels: very low (0-2 points), low (3-4 points), moderate (5 points), high (6-7 points) and very high (8-10 points).

Health related quality of life

Health related quality of life was assessed with the Portuguese validated version of the Medical Outcomes Study 36-Item Short Form Health Survey, known as SF-36[25]. The SF-36 questionnaire is a generic, multidimensional instrument, easily applied and understood, consisting of 36 items, divided in eight domains: physical functioning, physical role functioning, bodily pain, general health perception, vitality, social role functioning, emotional role functioning and mental health. The questionnaire presents a score of 0 to 100, where 0 represents the worst and 100 the best general health-related quality of life.

Anxiety

The level of anxiety was assessed with the State-Trait Anxiety Inventory (STAIT-T)[26]. It consists of 20 items and the subject is instructed to answer each item according to a 4-point *Likert* scale: 1-almost never, 2-sometimes, 3-often and 4-almost always. A score below 33 points indicates mild anxiety, between 33 and 49 points indicates moderate anxiety and a score over 49 points indicates severe anxiety[27].

Depression

The Beck Depression Inventory (BDI)[28;29] was used to assess the presence of depression; it consists of 21 items, including symptoms and attitudes, ranging from 0 to 3. The items refer to sadness, pessimism, sense of failure, lack of satisfaction, feelings of guilt, sense of punishment, self-deprecation, self-accusations, suicidal ideas, crying spells, irritability, social withdrawal, lack of decision, distortion of body image, work inhibition, sleep disturbance, fatigue, loss of appetite, weight loss, somatic preoccupation and decreased libido. Scores lower than 11 points indicates no depression, between 11 and 19 points, mild depression, between 20 and 25 points, moderate depression, and greater than 26 points, severe depression.

Statistical analysis and study power

The statistical software used was SPSS 17.0 (SPSS Inc., Chicago, IL, USA). Since the majority of the variables showed a non-normal distribution, notably the study's primary outcome (steps/day), nonparametric statistical analysis was performed, and results were presented as median

[25%-75% interquartile range]. For comparison between groups at baseline, comparison between the subgroups in each group and comparison between the improvement in steps/day between subgroups, the Mann-Whitney test was used. Comparisons between the different assessment points in each subgroup were performed using the Friedman test, and for comparison between pair of groups, the Wilcoxon test was used with the Bonferroni correction method. The Chi-Square test was used for comparing categorical data. Correlations were evaluated using the Spearman correlation coefficient. All tests had significance level of $p<0.05$.

Power of the study was analyzed with the software PS 3.0 - 2009 (Vanderbilt, United States of America) based on the main variable of the protocol (Δsteps/day), in the target subgroup (physically inactive subjects) of both groups (GP+B and GB+P). Considering an alpha of 0.05, an average post – pre protocol difference (ΔA4 – A1) of 3338 steps/day in GP+B physically inactive subgroup (n=12) and an average standard deviation of 2551 steps/day, the study has a 87% power to detect a significant difference in this outcome. When considering an average post – pre protocol difference (ΔA4 – A1) of 2928 steps/day in GB+P physically inactive subgroup (n=7) and an average standard deviation of 1014 steps/day, the study has a 99% power to detect a significant difference in this outcome. When analyzing the study power considering ΔA3 – A1, the GP+B physically inactive subgroup (n=12) showed a power of 85% and the GB+P physically inactive subgroup (n=7) a power of 40% to detect a significant difference in this outcome.

Results

Seventy-six individuals were assessed for eligibility and randomized to GB+P (n=37) and GP+B (n=39), whereas the final assessment at A4 consisted of 13 subjects in the GB+P and 18 in GP+B. The study flow chart (including the reasons for dropping out) is described in Figure 2. The proportion of drop-outs in the two groups (GB+P 65% and GP+B 54%) was not statistically different ($p = 0.33$). When comparing the baseline characteristics of the subjects who finalized the protocol (completers) and the ones who dropped out the study (drop-outs), there was no difference in GP+B. In GB+P, the only difference was concerning the age of completers (54[50-58]years) and drop-outs (49[42-51]years) ($p = 0.03$).

The baseline characteristics of GB+P and GP+B are described in Table 1. In the baseline assessment, there was significant difference between the groups only concerning the body mass index (BMI) (26 [24-32] *vs* 24 [22-26] $Kg.m^{-2}$, respectively; $p=0.03$). Occupational status of the sample was as follows: 13% (4) of the participants were retired, 16% (5) housewives, and 71% (22) worked at administrative tasks, sales staff and technical jobs at a variety of companies and public institutions such as retailer shops, schools, banks and health institutions. When comparing the proportion of formally employed workers versus non-workers (retired, students and housewives) between the groups GB+P and GP+B, there was no significant difference (workers at GP+B: 61% [11

out of 18] and in GB+P: 84% [11 out of 13]; p=0.16). No participant changed his/her occupational status during the period of the study.

Out of the 13 smokers included in the GB+P, 6 (46%) were classified as physically active and 7 (54%) as inactive according to the baseline assessment of physical activity in daily life. The differences between the physically active and inactive subgroups in the GB+P were the higher number of steps/day (p=0.001) and the lower BMI (p=0.02) in the physically active subgroup (table 2).

Out of the 18 smokers included in the GP+B, 6 (33%) were classified as physically active and 12 (67%) as inactive according to the baseline assessment of physical activity in daily life. Once again, the only differences between the subgroups were higher number of steps/day (p<0.001) and the lower BMI (p=0.04) in the physically active subgroup (Table 2).

In GB+P, the physically active subgroup showed no significant change in the number of steps/day throughout the protocol (p=0.57 in the Friedman test; figure 3B). The physically inactive subgroup showed a strong trend for improvement in steps/day when comparing A2 and A3 with A1 (p=0.06 for both), and this difference reached statistical significance when comparing A4 with A1 (p=0.02) (figure 3A). Δ (A4 – A1) steps/day was significantly larger in the inactive subgroup in comparison to the active subgroup (2841 [2371-3542] *vs* 648 [-1460-2430] steps/day, respectively, p=0.04; figure 5A).

In GP+B, the physically inactive subgroup significantly increased the number of steps/day at A2, A3 and A4 in comparison to A1 (p=0.002, p=0.005, p=0.005, respectively), as shown in Figure 4A. The physically active subgroup showed no significant change in the number of steps/day (p=0.71 in the Friedman test; figure 4B). The Δ (A4 – A1) steps/day was significantly larger in the inactive subgroup in comparison to the active subgroup (3230 [1138-5503] *vs* 1174 [-628-2146] steps/day, respectively; p=0.03; figure 5B).

When comparing Δ (A4 – A1) steps/day between the physically inactive subgroups of GP+B and GB+P, there was no significant difference (p=0.43).

There was a significant and negative correlation between Δ (A4 – A1) steps/day and the average number of steps/day at A1 in the GP+B physically inactive subgroup (r=-0.71; p=0.01), what was not observed in the GB+P physically inactive subgroup (r=-0.43; p=0.34).

Regarding smoking habits, GB+P had 46% of subjects presenting high and very high nicotine dependence and 54% presenting moderate, low and very low dependence. GP+B had 44% of subjects presenting high and very high nicotine dependence, whereas 56% presented moderate, low and very low dependence. No significant change was found in the number of cigarettes smoked per day and nicotine dependence after the protocol in any of the subgroups (Tables 3 and 4). Furthermore, concerning health related quality of life as well as symptoms of anxiety and depression, no significant change was found after the protocol in any of the subgroups (Tables 3 and 4).

Discussion

This study showed that two different protocols combining the use of pedometers and informative booklets were effective to promote the increase of physical activity in daily life in physically inactive smokers. However, it also highlighted that those physically inactive smokers who received the pedometer as the first intervention presented a more rapid increase in their daily number of steps.

The short-term effect of using pedometers as an effective way of counteracting physical inactivity in apparently healthy smokers was already shown by preliminary data from our research group[16]. The present study (a follow-up of that preliminary investigation) confirmed the short-time effect of using this simple and relatively inexpensive tool to increase the number of steps per day in this population. Furthermore, it adds the information that the increase obtained in the first month of the protocol was maintained throughout the whole study period. We can hypothesize that the subject's immediate and successful response to the challenge of reaching a given target of steps/day by using a pedometer causes a rather long lasting impact, providing an easily understandable feedback and functioning also as a reminder of the need to maintain a higher level of physical activity[7;9]. On the other hand, those smokers who received the informative booklet as the first intervention showed a less pronounced (and statistically borderline) increase in the number of steps/days at the intermediate assessments, reaching statistical significance only at the last PADL assessment. We can hypothesize that the slower improvement in this group can be explained by the fact that written education and orientation are indirect ways to stimulate daily physical activity, and therefore do not result in an immediate impact on the number of steps/day as the pedometer rapidly did.

In this study, physically inactive smokers starting the protocol by using a pedometer showed a significant increase of 3230 [1138-5503] steps/day (45% in average) at the final assessment. Prochaska et al.[5] also used pedometers in a small subgroup of their smoking cessation group with the objective of increasing the number of steps/day. A significant increase of 1061 steps/day (16% in average) was found in that subgroup. However, the studied subjects were included in a program which provided pharmacological treatment, they were not divided according to baseline physical activity level and wore the pedometer for a shorter period of time. The present research is the first study to investigate the combination of pedometers and informative booklets to encourage the improvement of physical activity in daily life in apparently healthy smokers, not enrolled in a smoking cessation program, for a 5-month period. Therefore, results from the present study further build up on the knowledge about the increase of daily physical activity in smokers.

Pedometers were already used as a motivational tool in other populations. Houle et al.[15] showed a similar increase in daily physical activity (3388 ± 844 steps/day) in subjects following an acute coronary syndrome when using pedometers for 3 months with a target of steps/day to be achieved. After a 12-week intervention using pedometers in a group of sedentary individuals with type

2 diabetes, De Greef et al.[30] found that the intervention had a significant short-term impact in physical activity in daily life, with an average increase of about 2000 steps/day. Moore et al.[31] compared pedometers and diary records of physical activity in patients with COPD. The authors concluded that a daily written record appears to offer more promising results than the pedometer as a tool for measuring free-living physical activity in this population. However, it is already known that pedometers may not be sensitive enough as an outcome measure in patients with COPD due to this population's slow walking speed [32;33], what possibly explains these negative results.

Despite the fact that the relatively small sample size might be considered a possible limitation of this study, the analysis showed enough power to demonstrate statistically significant differences in the primary outcome, and specially to demonstrate the useful message that both approaches are ultimately effective but one provides quicker results than the other, although for the analysis of ΔA3 – A1, power was not optimal due to the high variability and small number of subjects. Other possible limitations are the differences of BMI and gender distribution between the subgroups (which are likely clinically irrelevant) as well as the relatively high dropout rate; however, high dropout rates do not seem to be uncommon in the smoking population[34]d. Furthermore, it is worthwhile to remind that the present protocol was not primarily aimed at smoking cessation and did not provide any pharmacological assistance, what may come as a factor to decrease the subjects' motivation to continue. It is therefore clear that the individuals who benefited from the present intervention were those motivated subjects who persisted in the protocol. Association of specific smoking cessation interventions and increase of physical activity by using pedometers seems an open window of investigation which might provide promising combined actions in the future.

In conclusion, both GP+B and GB+P strategies were effective in increasing the number of steps/day in physically inactive smokers after 5 months, although the increase was more quickly obtained in smokers submitted to the use of the pedometer as the first intervention (GP+B). These two strategies are promising for use in clinical practice, and further studies investigating the use of these and other strategies aiming to increase PADL of smokers are welcome.

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Figure Legends

Figure 1 – Study Design. GP+B: group pedometer+booklet; GB+P: group booklet+pedometer; A1: Assessment 1, and so on.

Figure 2 – Flow chart of the study. A1: Assessment 1, and so on.

Figure 3 – Changes in the number of steps/day after the protocol in the Group Booklet+Pedometer (GB+P). A. GB+P Inactive Subgroup; B. GB+P Active Subgroup; A1: assessment 1, and so on.

Figure 4 – Changes in the number of steps/day after the protocol in the Group Pedometer+Booklet (GP+B). A. GP+B Inactive Subgroup; B. GP+B Active Subgroup; A1: assessment 1, and so on.

Figure 5 – Comparison of delta steps/day (A4 – A1) between physically inactive (Inact) and active (Act) subgroups. A. Group Booklet+Pedometer (GB+P); B. Group Pedometer+Booklet (GP+B). *p<0.05.

Acknowledgments:

The authors would like to thank the colleagues from the ----------
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FIGURAS

Figure 1

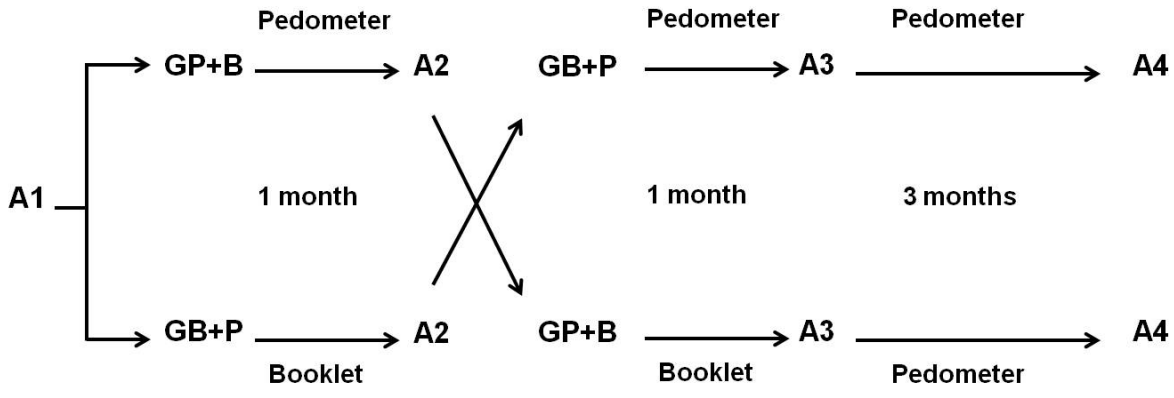

Figure 1. Study Design. GP+B: group pedometer+booklet; GB+P: group booklet+pedometer; A1: Assessment 1, and so on.

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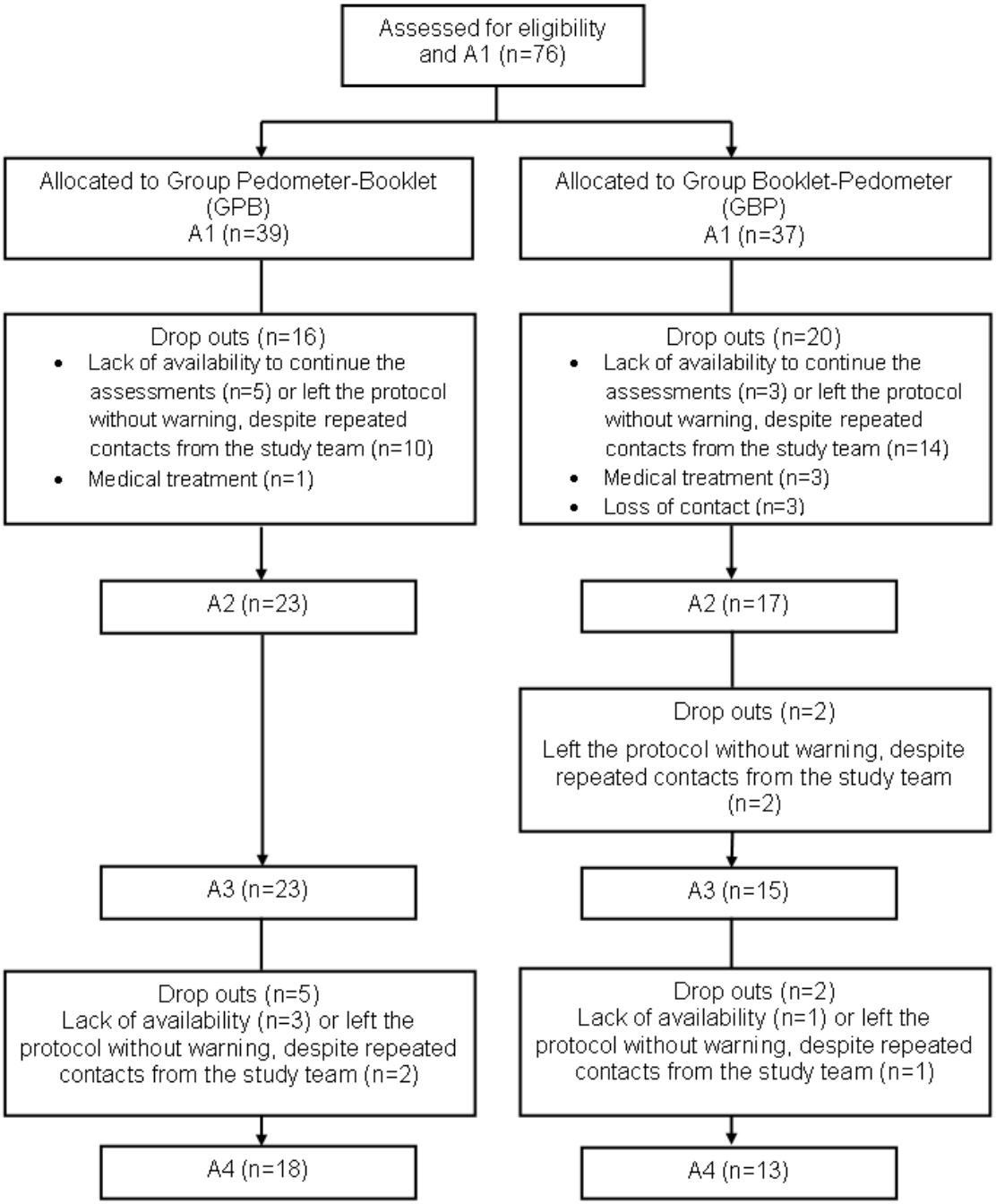

Figure 3

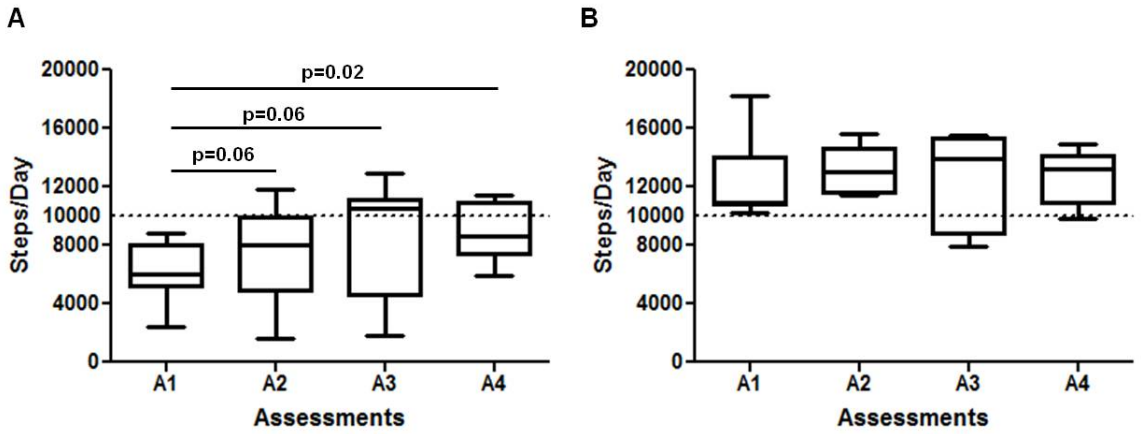

Figure 3. Changes in the number of steps/day after the protocol in the Group Booklet+Pedometer (GBP). A. GBP Inactive Subgroup; B. GBP Active Subgroup; A1: Assessment 1, and so on.

Figure 4

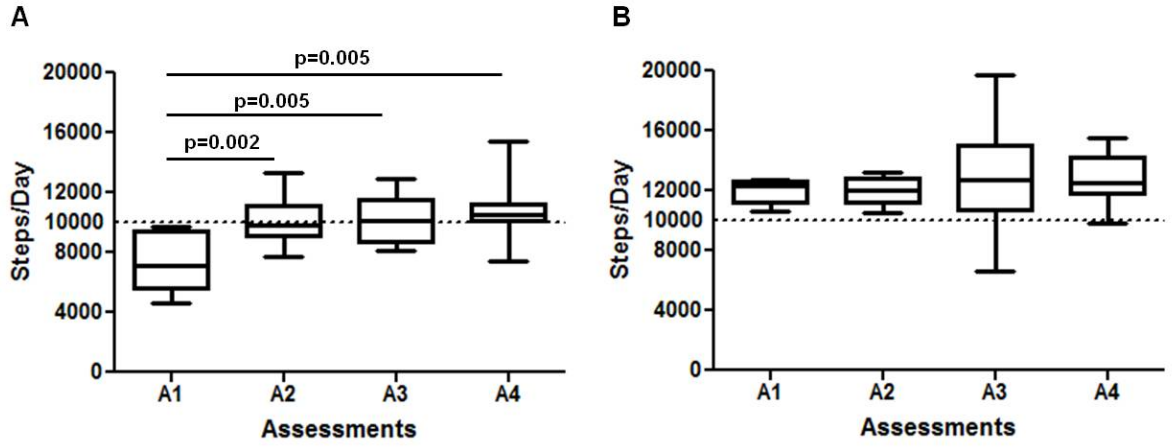

Figure 4. Changes in the number of steps/day after the protocol in the Group Pedometer-Booklet (GPB). A. GPB Inactive Subgroup; B. GPB Active Subgroup; A1: Assessment 1, and so on.

Figure 5

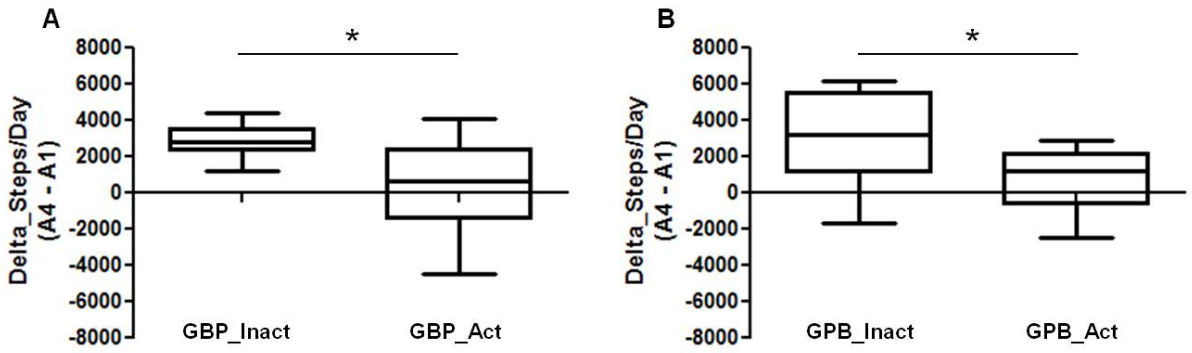

Figure 5. Comparison of delta steps/day (A4 – A1) between physically inactive (Inact) and active (Act) subgroups. A. Group Booklet-Pedometer (GBP); B. Group Pedometer-Booklet (GPB). *p<0.05.

Table 1 – Characteristics of the studied groups: group booklet+pedometer (GB+P) and group pedometer+booklet (GP+B)

	GB+P (n=13)	**GP+B (n=18)**	***p***
Gender (M/F)	8/5	5/13	0.06
Age (years)	54 [50-59]	51 [45-55]	0.15
BMI (Kg.m^{-2})	26 [24-32]	24 [22-26]	0.03
Cig/Day	30 [20-35]	20 [12-22]	0.13
Pack/Years	40 [25-66]	34 [20-47]	0.33
FTQ	5 [3-7]	5 [5-7]	0.74
FEV_1 (%pred)	82 [70-93]	91 [85-97]	0.09
FEV_1/FVC	81 [73-85]	79[76-84]	0.77
PADL (steps/day)	8779 [5748-10938]	9401 [6498-11566]	0.98
6MWT (m)	566[511-607]	542[503-603]	0.68
6MWT (%pred)	82 [75-87]	84 [75-89]	0.77
SF-36 PF	90 [77-97]	92 [82-100]	0.65
SF-36 PRF	100 [75-100]	100 [81-100]	0.83
SF-36 BP	72 [56-100]	74 [58-100]	0.62
SF-36 GHP	67 [46-77]	78 [63-92]	0.09
SF-36 Vit	75 [67-85]	72 [50-80]	0.37
SF-36 SRF	100 [75-100]	94 [50-100]	0.54
SF-36 ERF	100 [0-100]	100 [0-100]	0.80
SF-36 MH	72 [64-76]	66 [43-85]	0.98
BDI	9 [4-18]	9 [3-22]	0.95
STAIT-T	41 [35-49]	37 [30-51]	0.35

Data presented as median [25%-75% interquartile range]. BMI: body mass index; Cig/Day: number of cigarettes per day; Pack/Years: pack/years index; FTQ: Fageström Tolerance Questionnaire; FEV_1: forced expiratory volume in the first second; FEV_1/FVC: forced expiratory volume in the first second and forced vital capacity ratio; PADL: physical activity in daily life; 6MWT: six minute walking test; SF-36: Short Form (36) Health Survey; PF: physical functioning; PRF: physical role functioning; BP: bodily pain; GHP: general health perceptions; Vit: vitality; SRP: social role functioning; ERF: emotional role functioning; MH: mental health; BDI: Beck Depression Inventory; STAIT-T: State-Trait Anxiety Inventory.

Table 2 – Comparison between physically active and physically inactive subjects of group booklet+pedometer (GB+P) and group pedometer+booklet (GP+B) at baseline

	GB+P									
	Physically Active (n=6)					Physically Inactive (n=7)				
	A1	**A2**	**A3**	**A4**	***p***	**A1**	**A2**	**A3**	**A4**	***p***
BMI ($Kg.m^{-2}$)	24[19-26]	23[18-27]	23[18-27]	23[19-27]	0.86	32[26-34]	31[26-34]	31[25-34]	31[26-34]	0.53
Cig/Day	25[11-30]	22[11-30]	22[10-30]	20[10-30]	0.83	30[20-40]	20[19-42]	20[20-40]	20[15-20]	0.17
FEV_1 (%pred)	84[68-110]	82[66-98]	83[61-104]	84[68-105]	0.30	82[76-92]	78[71-87]	75[73-83]	79[63-85]	0.20
SF-36 PF	92[86-95]	92[86-95]	95[80-95]	92[90-95]	0.42	80[75-100]	92[82-95]	95[85-95]	90[85-95]	0.37
SF-36 PRF	90[90-94]	100[81-100]	100[81-100]	100[81-100]	0.70	100[25-100]	100[100-100]	100[75-100]	100[25-100]	0.24
SF-36 BP	67[54-93]	61[54-78]	79[64-96]	78[64-96]	0.77	72[62-100]	78[48-100]	84[61-100]	74[51-100]	0.57
SF-36 GHP	77[62-81]	82[59-89]	77[69-90]	82[71-93]	0.28	67[37-67]	77[61-77]	87 [52-97]	80[57-87]	0.15
SF-36 Vit	77[66-85]	75[41-86]	85[42-97]	77[56-95]	0.92	75[60-75]	67[60-77]	75[65-85]	75[70-85]	0.65
SF-36 SRF	87[56-100]	81[53-100]	82[54-100]	87[66-100]	0.21	100[75-100]	100[63-100]	100[87-100]	100[75-100]	0.76
SF-36 ERF	50[0-100]	66[16-92]	55[2-100]	66[8-100]	0.93	100[0-100]	33[25-100]	100[67-100]	100[33-100]	0.27
SF-36 MH	70[64-82]	65[48-84]	80[65-92]	78[69-93]	0.69	76[68-76]	76[66-89]	80[80-88]	80[72-92]	0.66
BDI	6[3-18]	5[2-16]	6[1-12]	6[2-12]	0.34	11[3-18]	6[2-11]	4[3-10]	7[5-14]	0.21
STAIT-T	39[35-51]	38[35-54]	31[28-49]	36[29-51]	0.19	38[35-42]	34[28-47]	39[29-42]	32[27-39]	0.08

Data presented as median [25%-75% interquartile range]. BMI: body mass index; Cig/Day: number of cigarettes per day; Pack/Years: pack/years index; FTQ: Fageström Tolerance Questionnaire; FEV_1: forced expiratory volume in the first second; FEV_1/FVC: forced expiratory volume in the first second and forced vital capacity ratio; PADL: physical activity in daily life; 6MWT: six minute walking test; SF-36: Short Form (36) Health Survey; PF: physical functioning; PRF: physical role functioning; BP: bodily pain; GHP: general health perceptions; Vit: vitality; SRP: social role functioning; ERF: emotional role functioning; MH: mental health; BDI: Beck Depression Inventory; STAIT-T: State-Trait Anxiety Inventory.

Table 3 – Comparison between the different assessments in the group booklet+pedometer (GBP), both in the physically active and the physically inactive subjects.

	GB+P (n=13)			GP+B (n=18)		
	Physically Active (n=6)	**Physically Inactive (n=7)**	***p***	**Physically Active (n=6)**	**Physically Inactive (n=12)**	***p***
Gender (M/F)	3/3	5/2	0.43	1/5	4/8	0.46
Age (years)	54[51-58]	54[49-60]	0.73	46[38-53]	51[48-56]	0.18
BMI (Kg.m^{-2})	24[22-27]	32[26-34]	0.02	21[19-24]	24[24-27]	0.04
Cig/Day	25[17-30]	30[20-40]	0.37	20[18-27]	20[12-27]	0.68
Pack/Years	38[28-52]	23[18-57]	0.63	30[21-54]	37[17-48]	0.89
FTQ	5[3-7]	5[3-8]	0.53	5[5-7]	5[3-7]	0.82
FEV_1 (%pred)	82[68-101]	82[76-92]	0.73	97[83-106]	90[86-95]	0.29
FEV_1/FVC	79[75-84]	81[73-87]	0.94	77[74-79]	81[77-86]	0.10
PADL (steps/day)	10938[10667-14045]	5982[5136-8037]	0.001	12325[11158-12608]	7157[5467-9429]	0.001
6MWT (m)	563[479-605]	566[518-635]	0.63	563[515-623]	539[500-594]	0.55
6MWT (%pred)	81[75-87]	82[74-90]	0.94	86[75-91]	82[74-88]	0.62
SF-36 PF	90[82-96]	80[75-100]	0.63	95[84-96]	87[77-100]	0.68
SF-36 PRF	100[94-100]	100[25-100]	0.37	100[75-100]	100[44-100]	0.89
SF-36 BP	67[51-100]	72[62-100]	0.73	73[44-100]	79[64-100]	0.68
SF-36 GHP	77[56-82]	67[37-67]	0.10	87[62-83]	74[59-89]	0.44
SF-36 Vit	82[69-87]	75[60-75]	0.18	65[45-85]	72[52-80]	0.89
SF-36 SRF	87[69-100]	100[75-100]	0.84	75[44-100]	94[62-100]	0.68
SF-36 ERF	100[0-100]	100[0-100]	0.94	100[0-100]	66[0-100]	0.75
SF-36 MH	66[57-78]	76[68-76]	0.37	68[40-85]	66[42-87]	0.89
BDI	8[4-21]	11[3-18]	0.84	10[0-22]	8[3-21]	0.89
STAIT-T	44[36-52]	38[35-42]	0.37	38[30-54]	36[29-49]	0.62

Data presented as median [25%-75% interquartile range]. BMI: body mass index; Cig/Day: number of cigarettes per day; FEV_1: forced expiratory volume in the first second; FEV_1/FVC: forced expiratory volume in the first second and forced vital capacity ratio; SF-36: Short Form (36) Health Survey; PF: physical functioning; PRF: physical role functioning; BP: bodily pain; GHP: general health perceptions; Vit: vitality; SRP: social role functioning; ERF: emotional role functioning; MH: mental health; BDI: Beck Depression Inventory; STAIT-T: State-Trait Anxiety Inventory.

Table 4 – Comparison between the different assessments in group pedometer+booklet (GPB), both in the physically active and the physically inactive subjects.

	GP+B									
	Physically Active (n=6)					Physically Inactive (n=12)				
	A1	**A2**	**A3**	**A4**	***p***	**A1**	**A2**	**A3**	**A4**	***p***
BMI ($Kg.m^{-2}$)	21[19-24]	22[19-24]	21[19-24]	22[20-24]	0.11	24[24-27]	25[23-27]	25[24-27]	25[24-26]	0.87
Cig/Day	20[18-27]	20[16-27]	18[14-27]	19[7-27]	0.09	20[12-27]	20[10-27]	13[7-29]	17[7-30]	0.98
FEV_1 (%pred)	97[83-106]	92[79-101]	91[77-104]	94[78-104]	0.07	90[86-95]	87[81-94]	86[72-90]	89[83-94]	0.72
FEV_1/FVC	77[74-79]	75[73-79]	76[72-82]	79[76-82]	0.75	81[77-86]	81[78-87]	81[78-86]	84[79-87]	0.51
SF-36 PF	95[84-96]	100[85-100]	95[80-100]	97[89-100]	0.13	87[77-100]	95[76-100]	90[79-100]	95[90-100]	0.83
SF-36 PRF	100[75-100]	100[69-100]	75[15-100]	100[75-100]	0.19	100[44-100]	100[100-100]	100[100-100]	100[100-100]	0.26
SF-36 BP	73[44-100]	75[36-100]	62[54-100]	87[46-100]	0.81	79[64-100]	100[64-100]	84[57-100]	84[63-100]	0.53
SF-36 GHP	87[62-93]	84[69-96]	79[56-100]	91[82-98]	0.29	74[59-89]	92[81-96]	92[64-96]	82[75-99]	0.36
SF-36 Vit	65[45-85]	62[47-85]	60[40-79]	82[35-92]	0.32	72[52-80]	77[57-89]	80[46-85]	85[54-90]	0.55
SF-36 SRF	75[44-100]	62[41-100]	87[22-100]	87[44-100]	0.60	94[62-100]	81[75-100]	94[56-100]	100[65-100]	0.40
SF-36 ERF	100[0-100]	100[50-100]	100[25-100]	100[25-100]	0.71	66[0-100]	100[25-100]	100[75-100]	100[16-100]	0.11
SF-36 MH	68[40-85]	80[38-93]	82[49-97]	90[52-92]	0.08	66[42-87]	73[55-88]	80[58-91]	72[50-87]	0.62
BDI	10[0-22]	5[0-16]	4[0-13]	5[2-8]	0.29	8[3-21]	4[2-18]	6[2-16]	6[1-15]	0.24
STAIT-T	38[30-54]	31[28-51]	32[25-45]	36[27-46]	0.15	36[29-49]	34[25-47]	35[23-39]	37[26-43]	0.42

Data presented as median [25%-75% interquartile range]. BMI: body mass index; Cig/Day: number of cigarettes per day; FEV_1: forced expiratory volume in the first second; FEV_1/FVC: forced expiratory volume in the first second and forced vital capacity ratio; SF-36: Short Form (36) Health Survey; PF: physical functioning; PRF: physical role functioning; BP: bodily pain; GHP: general health perceptions; Vit: vitality; SRP: social role functioning; ERF: emotional role functioning; MH: mental health; BDI: Beck Depression Inventory; STAIT-T: State-Trait Anxiety Inventory.

CONCLUSÃO GERAL

O presente estudo mostrou que, a médio prazo, os dois protocolos que se utilizaram de pedômetros e cartilhas informativas foram igualmente efetivos para promover o aumento da atividade física da vida diária de tabagistas fisicamente inativos. Além disso, mostrou que o aumento foi obtido mais rapidamente em tabagistas submetidos ao uso de pedômetro como primeira intervenção. Em relação ao hábito tabagístico, grau de dependência nicotínica, qualidade de vida relacionada à saúde e sintomas de ansiedade e depressão, não ocorreram mudanças significativas após os protocolos. Em suma, essas duas estratégias são promissoras para o aumento da atividade física diária na prática clínica em tabagistas, e estudos futuros investigando em maior profundidade o uso destas e outras estratégias são bem vindos.

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ANEXOS

ANEXO A

Normas de formatação do periódico *American Journal of Physical Medicine and Rehabilitation*

INSTRUCTIONS FOR AUTHORS

Mission Statement

The mission of the *American Journal of Physical Medicine & Rehabilitation* is to publish articles about all aspects of PM&R and to promote excellence in education, scientific research, clinical practice, health policy, and administration.

The *American Journal of Physical Medicine & Rehabilitation* is the official scholarly journal of the Association of Academic Physiatrists (AAP).

The scope of the *Journal* emphasizes all aspects of the specialty of physiatry, including pediatric, adult, and geriatric physical medicine, rehabilitation, and electrodiagnostic medicine. The practice focus is on the clinical and administrative aspects of physical medicine, rehabilitation, and electrodiagnostic medicine. The research focus emphasizes clinical inquiry and also explores basic science.

The educational focus is on the application of modern teaching techniques/technology to graduate, undergraduate, and postgraduate physiatric instructional programs.

The overall goal of the *Journal* is to enhance the interrelationship of practice, research, and education to advance the field of physiatric medicine for the ultimate benefit of the patient.

Conditions for Submission

The author: (1) assures that the manuscript is an original work that has not been previously published; (2) assures that the manuscript has not been previously submitted to any other publication; (.3) accepts full responsibility for the accuracy of all content, including findings, citations, quotations, and references contained within the manuscript; (4) releases and assigns all rights for the publication of the manuscript to Lippincott Williams & Wilkins; (5) discloses on the title page any conflicts of interest related to the research or the manuscript; (6) discloses on the title page any previous presentation of the research, manuscript, or abstract; (7) assures that authorship has been granted only to those individuals who have contributed substantially to the research or manuscript; (8) discloses in the methods section of the manuscript that any investigation involving human subjects or the use of patient data for research purposes was approved by the committee on research ethics at the institution in which the research was conducted in accordance with the Declaration of the World Medical Association (www.wma.net) and that any informed consent from human subjects was obtained as required; (9) attaches documents showing all relevant permissions to publish quotations, text, tables, or illustrations from copyrighted sources; (10) discloses in the manuscript references and/or table/figure footnotes the full citation and permission of the copyright owner as required.

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Categories of Manuscripts

The *American Journal of Physical Medicine & Rehabilitation* invites submission of original papers, particularly in the categories below, for consideration to publish in order of preference.

1. *Scientific Research Article:* Original scientific investigations that advance the field of physiatric medicine. These papers include in order of preference: (1) Cohort studies, such as randomized, controlled trials and longitudinal studies; (2) Case-control studies; (3) Historical prospective studies; (4) Cross-sectional studies; and (5) Radiologic Studies. LIMITS: 6,000 words; 7 Tables; 7 Figures
2. *CME Article:* Original scientific research papers as described above specifically selected by the editors to be published as an educational activity in the *Journal*. Authors may request to have a paper considered for selection as a CME Article. LIMITS: 6,000 words; 7 Tables; 7 Figures
3. *Education & Administration Article:* Short papers or surveys addressing issues concerning education, student training, and administration in the field of physical medicine & rehabilitation. LIMITS: 4,000 words; 4 Tables; 4 Figures
4. *Brief Report:* Short papers reporting on research techniques, statistical techniques, and clinical aspects of physical medicine & rehabilitation. LIMITS: 3,000 words; 4 Tables; 4 Figures
5. *Case Report:* Short reports explaining the diagnosis, treatment, and outcomes of individual cases of specific conditions to clarify and improve patient care. Cases must be unique to the published medical literature. Any treatment recommendations should reflect current medical practice and cite references from previously published research. LIMITS: 2,000 words; 4 Tables; 4 Figures
6. *Clinical Note:* Brief comment on patient diagnosis or treatment resulting from personal clinical experience. LIMITS: 1,000 words; 2 Tables; 2 Figures
7. *Commentary:* Short editorial-like paper promoting a particular viewpoint on matters relating to the clinical, scientific, and educational aspects of physical medicine & rehabilitation. LIMITS: 2,000 words; 2 Tables; 2 Figures
8. *Analysis:* In-depth systematic examination of complex issues of significant interest to readers and authored by a recognized expert in the field of physical medicine & rehabilitation. LIMITS: 7,000 words; 7 Tables; 7 Figures
9. *Perspective:* In-depth elaboration of viewpoints and personal experiences of interest to readers and authored by a recognized expert in the field of physical medicine & rehabilitation. LIMITS: 7,000 words; 7 Tables; 7 Figures
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The following instructions will assist authors in preparation and submission of the manuscript files.

Digital files of all manuscripts must be submitted by email attachment to **journal@physiatry.org**

Subject Line of the email should be:

New Manuscript Submission

The email text should identify the sender and the title of the new manuscript submission. Include the following Microsoft Word document file attachments:

Cover Letter.doc briefly explaining the reason for the submission and briefly explaining what is new or important about the manuscript.

Manuscript.doc containing the entire manuscript file including the Title Page, Abstract Page, Manuscript Text, References, Figure Legends, and Acknowledgments

Tables.doc containing each Table in order on a separate page. Location of each table and figure should be clearly indicated in the manuscript text.

Figures must be uploaded. After the cover letter and manuscript document attachments are received, the Journal editorial office will reply to acknowledge receipt and provide additional instructions for sending figures based on the information provided in the Figure Legends at the end of the manuscript document. Updates to email submission procedures will be posted at www.physiatry.org

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The cover letter must designate one corresponding author and include the author's complete mailing address, telephone number, fax number, and email address. The cover letter should explain why the manuscript will be of interest to the Journal's readers. Please indicate briefly what is important or unique about the submission that has not been previously published in the medical literature.

The editorial office must be notified immediately if any author contact information changes. Authors in medical school or residency training must supply contact information of a mentor or additional author at the same institution. If the paper was part of a presentation to a professional association, this fact should be explained. If any of the authors have a conflict of interest, this should be explained in the cover letter. In addition to the cover letter, authors must include pdf file copies of permissions to reproduce previously copyrighted material or illustrations.

Preparation of the Manuscript Document

Refer to previously published issues of the Journal for the current format for each category of article. A sample issue is available at www.AJPMR.com The *Journal* encourages blind reviews. Any identifying author information on the manuscript should be limited to the title page. Do not include any author, institution, or location information on the abstract page or text pages of the manuscript. Each component of the manuscript should be in the same document and begin on a separate page in the following sequence: Title Page, Abstract and Key Words, Text, References, Figure Legends, Acknowledgments. Use the File/Page Setup feature in MSWord to set up your document for one-inch margins on letter-sized paper. The manuscript must be double-spaced throughout, including the title page, abstract and key words page, text, references, figure legends, and acknowledgments. The **Title Page** should be prepared as follows: (1) **Title**; (2) **Authors:** Full names and academic degrees of each author; (3) **Affiliations:** Clearly explain the institutional, university, or hospital affiliations of each author; In the event an author changes institutional affiliation after submission but before publication, please provide both the institutional affiliation where the research was conducted, along with the current institutional affiliation of the author. (4) **Correspondence:** Name, mailing address, phone number, fax number, and email address for the corresponding author; (5) **Author Disclosures:** Include an explanation of the following: (5.1) funding or grants or equipment provided for the project from any source; (5.2) financial benefits to the authors; (5.3) details of any previous presentation of the research, manuscript, or abstract in any form. The **Abstract Page** should be prepared as follows: An abstract is required for all manuscripts except for Commentaries, Clinical Notes, Letters to the Editor, and Visual Vignettes. Do not include any author information on the Abstract Page. Structured abstracts for Research Articles must be double spaced and should succinctly address, in 200 words or less, the following four categories: **Objective, Design, Results, and Conclusions**. Refer to current copies of the *Journal* for examples. Traditional one-paragraph abstracts are required for all other categories of papers, including Brief Report, Case Report, Education & Administration, Literature Review, Analysis, and Perspective articles. Abstracts for Brief Reports and Case

Reports should succinctly summarize, in 150 words or less, the salient elements and conclusions of the paper. **Key Words:** Authors must include four Key Words (so labeled) on the line after the end of the abstract. Use appropriate MeSH subject headings as listed by the National Library of Medicine. For more information visit www.nlm.nih.gov/mesh/ **Preparation of the Manuscript Text** Refer to recently published issues of the Journal for the appropriate formatting and style of each section of the manuscript text. Software preference is Microsoft Word for document text and tables. Microsoft Word .doc file page set up should be one-inch margins on 8 ½ x 11 inch letter-sized paper (not A4 size). Manuscripts must be double-spaced throughout, including the Title Page, Abstract and Key Words, Text, References, Figure Legends and Acknowledgments. Pages should be numbered consecutively. The preferred type font for manuscript text is 11 pt. Times New Roman. **AMA Style:** Use generic names of drugs, unless there is a specific trade name that is directly relevant. Use only standard abbreviations as listed in the AMA Manual of Style, Ninth Edition. The full term for which an abbreviation stands should precede the abbreviation's first use in the text, except in the case of a standard unit of measurement. Avoid using abbreviations in the title and abstract. **Writing Quality:** *All manuscripts must be thoroughly edited for spelling and American English grammar by the authors and/or an expert in American English medical writing before submission. Manuscripts submitted with incorrect American English grammar will not be considered.* **Methodology and Statistics:** Any statistical analyses in the research or manuscript should be reviewed and verified for accuracy by the authors and/or a statistician before submission. Describe statistical methods with enough detail to enable the knowledgeable reader with access to the original data to verify the reported results. When possible, quantify research findings with appropriate indicators of measurement error or uncertainty (such as confidence). Avoid sole reliance on statistical hypothesis testing, such as the use of *P* values, which fails to convey important quantitative information. Discuss eligibility of experimental subjects. Give details about randomization. Describe the methods for, and success of, any blinding of observations. Report treatment complications. Give specific numbers of observations. Report any losses to observation (such as dropout from a clinical trial). References for study design and statistical methods should be to standard works (with pages stated) when possible, rather than to papers in which designs or methods were originally reported. Specify any computer programs used. **Units of Measure:** Measurements of length, height, weight, and volume should be reported in metric units. Temperatures should be written in degrees Celsius. Blood pressures should be given in millimeters of mercury. All hematologic and clinical chemistry measurements should be reported in the metric system in the terms of the International System of Units (SI). **Ethics:** When reporting experiments on human subjects, indicate in the methods section of the manuscript whether the procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional or regional) or with the Helsinki Declaration of 1975, as revised in 1983. The authors must state in the methods section of the manuscript that any investigation involving human subjects or the use of patient data for research purposes was approved by the committee on research ethics at the institution in which the research was conducted in accordance with the Declaration of the World Medical Association (www.wma.net) and that any informed consent from human subjects was obtained as required. *Failure to indicate Institutional Review Board approval of human experimentation and informed consent from subjects will result in rejection upon initial review.* Also indicate in the methods section whether the

institution's or the National Research Council's guidelines for, or any national laws on, the care and use of laboratory animals were followed. Do not use subjects' or patients' names, initials, or hospital numbers in the text, tables, figures, or legends. Photographs of patients or subjects will not be considered unless written approval signed by the patient or subject, is included with the submission cover letter.

References should be prepared as follows: References should be double-spaced and begin on a separate page following the conclusion of the manuscript. Authors should cite relevant references from previously published articles. Number references in the order in which they are mentioned in the text (do not alphabetize). Identify references with Arabic superscript numerals in the text, tables, and legends. References should be double-spaced, and the format should follow the current AMA style. Abbreviate the names of journals according to the format given in Index Medicus. References cited separately as footnotes in tables or figure legends should be numbered in accordance with a sequence established by the first identification of the particular table or figure in the text. Refer to current copies of the *Journal* for examples of the various types of references. All manuscripts except for extensive reviews of the literature should be limited to no more than 30 references. Authors may be asked to limit the number of references to conserve space. Previously published articles in this Journal are searchable by author and topic at www.AJPMR.com **Figure Legends** should be prepared as follows: Figure Legends should be double-spaced and begin on a separate page following the reference section of the manuscript. Each Figure Legend should describe the content of the appropriate figure and be numbered in order of location in the manuscript as Figure 1, Figure 2, etc. To conserve space, do not duplicate information in the text and figure legends. **Acknowledgments** should be prepared as follows: Authors often wish to thank individuals who have assisted with the research project or the preparation of the manuscript. Acknowledgments should begin on a separate page following the Figure Legends. Any information concerning funding or equipment for the project should be included in the Disclosures section on the Title Page. **Preparation of Tables and Figures** Tables should be created in Microsoft Word and saved as a separate document file named **Tables.doc** with each table numbered in the same order mentioned in the manuscript as Table 1, Table 2, etc. Each table should begin on a separate page. The table number and short Table Legend should be placed above the table. Any footnotes cited in the table should be placed below the table. Refer to current issues of the Journal for specific examples of table formats. Figures must be uploaded as high resolution TIF image files named Figure 1, Figure 2, etc. Each TIF image file must be ready for professional print publishing. Jpeg image files are not acceptable. Poor quality figures and figures sent by email attachment will not be considered. The Journal's upload address for figures will be provided via email after receipt of the New Manuscript Submission email containing the cover letter and manuscript document attachments. **Photographs** must be uploaded as high resolution TIF image files with a resolution of 300 dpi/ppi. (dots per inch/pixels per inch). **Charts** and **graphs** and **line art** and **EMG waveform readouts** must be uploaded as TIF image files with a resolution of 1200 dpi/ppi. *Helpful Note: The dpi/ppi properties of an image file can be viewed in the file/properties window when the image is on the computer screen.* **Charts or graphs** should be created as Microsoft Excel files. In addition to uploading a 1200 dpi TIF image file for each figure, the original .xls file for each chart or graph should also be uploaded. The .xls file should display the figure in actual size. This allows the Journal to make adjustments for style and fonts as needed. The preferred font styles for charts and

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• Three objectives answering the question: "Upon completion of this article, the reader should be able to:"
• Five questions/answers for self-assessment
• A sentence about each author that describes institution affiliation and current position. Including the above with the original manuscript submission will greatly

expedite consideration of the manuscript for publication as a CME article. See examples in the Journal.

Letters to the Editor

The *Journal* welcomes intellectual and scholarly letters of comment about articles published in the *Journal* or other matters of general interest. Follow the email submission procedures for submitting Letters to the Editor. References may be included to support opinions. The Editor reserves the right to determine which letters shall be published and to shorten letters as necessary.

Commentaries

The Journal encourages authors to contribute expert opinion in the form of a short commentary. A commentary is a concise paper that promotes a particular viewpoint. Papers that follow the format for a commentary do not have abstracts and should be limited to no more than eight double-spaced typed pages, including references. Include four key words. Follow the email submission procedures.

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The purpose of Visual Vignettes is to provide a rapid, interesting, and enjoyable mechanism by which to further educate and stimulate the readers of the *Journal* using both visual aids and written information. The visual aids that authors submit may include any of the following:

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- CT scans
- MRI scans
- Graphs or diagrams
- Photos of electron microscope findings
- EKG printouts
- Electrodiagnostic printouts (NCS or needle exam)
- Photo of a patient or medical device

Follow the instructions for email submission. All images must be high resolution and may be submitted in either black & white or color. Electronic image files must be uploaded in .TIF file format with a resolution of 300 dpi/ppi for photographs and 1200 dpi/ppi for charts, graphs, diagrams, line art, or waveforms. The upload address for figures will be provided via email upon request. Accompanying the visual aid should be a written text between 200 and 400 words. The text should include a brief and concise clinical review of the specific patient or clinical issue. This should be followed by a description of the visual aid and an explanation of how such aid may have influenced/affected the management of the patient (diagnosis, treatment, medical and/or PM&R management issues). As appropriate, a summary of the particular pathology or disease process may be included. Finally, any clinical or academic “pearls” to be learned from the visual aid should be included. References should be limited to a maximum of four. Also include a one sentence figure legend to be published beneath the image. The visual aid and text must be limited to one page of the published Journal.

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Selected abstracts of scientific posters presented at the Annual AAP Spring Meeting may be published in the *Journal*. The Editor may shorten or edit abstracts selected

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New manuscript submissions received via email will be acknowledged via email. A pre-submission evaluation will take place to determine whether the submission meets the Journal's submission requirements. Authors will be requested to reply via email with any additional information necessary to facilitate the review process. The upload address for figures will be provided via email. After all the required author information and manuscript electronic files have been received, the corresponding author will be informed of the manuscript ID number, and an initial review will take place to determine if the manuscript is appropriate for the Journal. Following the initial review, the author will be notified by email whether the manuscript has been selected for the extended peer review process. Following the extended peer review process, authors will be notified of the editorial decision by email. Authors may be asked to revise the manuscript according to the reviewer's comments and to return hard copies and electronic copies of the revised manuscript.

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Authors should use the tools/track changes feature in Microsoft Word to edit the paper. Show all additions to the text in red underline and all deletions in red strikeout. Send to the Journal three electronic files via email attachment: (1) Revision Cover Letter explaining point by point how each of the reviewer comments were addressed and where in the marked manuscript the changes were made. (2) Revised Marked file showing all editing changes in the text; (3) Revised Clean file showing a final cleaned-up version after all changes have been accepted. Send the three files electronically as email attachments. The subject line of the email should contain the manuscript ID number. The attachments should be named with the manuscript ID number, plus "Revision Cover Letter" or "Revised Marked" or "Revised Clean." If no additional changes are requested, the author will receive an acceptance notification by email.

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Appeals must be made in writing within one month of receiving the decision regarding a manuscript. A previously rejected manuscript may be resubmitted with a cover letter explaining why the decision is being appealed. The cover letter should also explain any changes that have been made in the manuscript. The author will be notified of the final decision.

Editorial Correspondence

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• The Howard Hughes Medical Institute (HHMI) requires as a condition of research grants, deposit in PMC, but in its case within six months after publication of the final article.

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ANEXO B

Cartilha de Incentivo à Atividade Física

Benefícios da atividade física em sua vida diária

A preocupação de promover e manter a saúde deve ser ressaltada cada vez mais, como parte da rotina diária para combater os efeitos nocivos da vida sedentária.

O que é atividade física ?

Atividade física é definida como qualquer movimento corporal, produzido pelos músculos esqueléticos, que resulte em gasto energético maior que os níveis de repouso. Vale tudo: andar, dançar, correr, passear com o cachorro, fazer compras a pé, subir e descer escadas, fazer jardinagem, enfim, levar uma vida mais ativa!

É importante lembrar que atividade física é diferente de exercício físico, onde é realizada a atividade física programada e regular, com objetivos específicos.

Desse modo, não são necessários níveis altos de prática física, horas de exercício, dor e sofrimento. Para aproveitar as vantagens da atividade física, é suficiente aumentar o grau de integração desta à vida diária, combatendo o sedentarismo e seus riscos para a saúde.

O tabagismo atualmente permanece como a principal causa de morte em todo o mundo, e a associação do tabagismo com a inatividade física é potencialmente desastrosa e deve ser combatida. O Colégio Americano de Medicina Esportiva (ACSM) recomenda a meta de cerca de 10.000 passos por dia, equivalente a 30 minutos de atividade física moderada diariamente, e conforme o estude de Garcia-Aymerich et.al, esse aumento da atividade física regular pode trazer importantes benefícios futuros para essa população tabagista. Baseado em estudos disponíveis na literatura que obtiveram sucesso ao usar pedômetros para aumentar a atividade física diária em diversas populações, espera-se que o presente estudo atinja seu objetivo ao proporcionar um modo de vida mais ativo aos fumantes envolvidos, e aumente a consciência desses indivíduos sobre a necessidade de manter um dia-a-dia mais ativo e saudável a fim de melhorar a qualidade de vida e sobrevida dessa população.

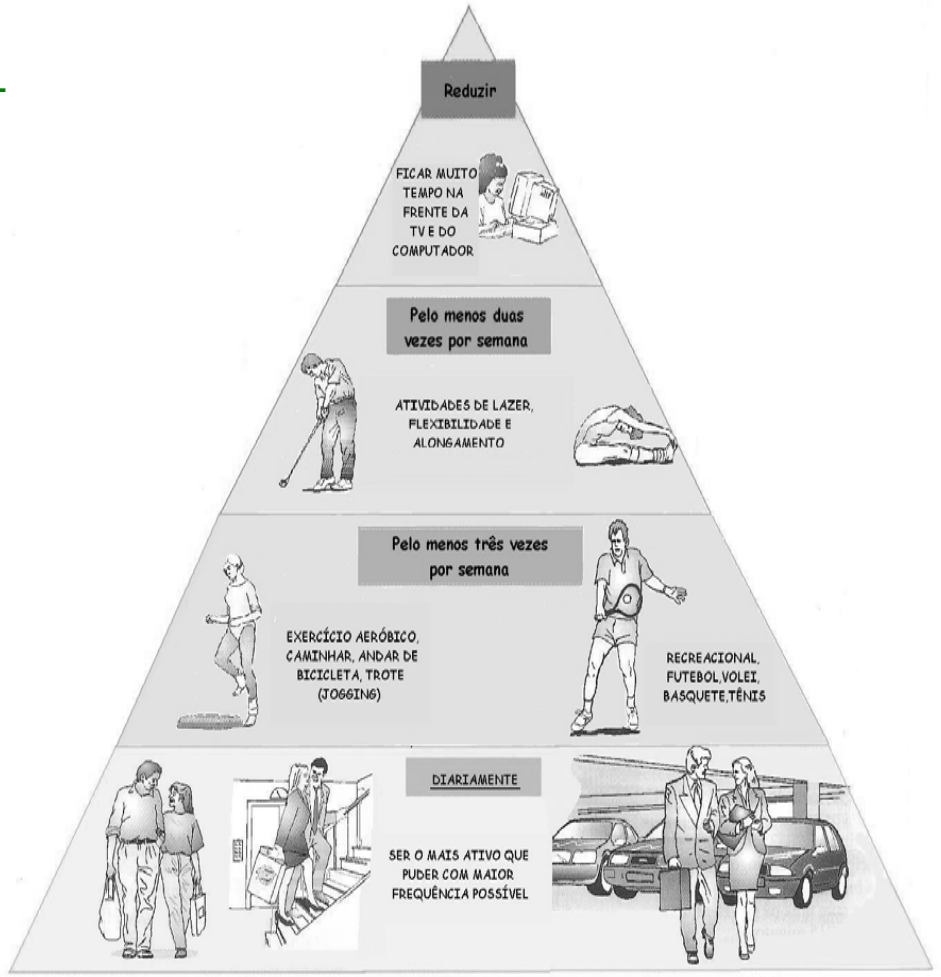
A atividade física promove muitos benefícios para o corpo e a mente, interferem na aparência, no dia-a-dia e no trabalho, e na saúde como um todo.

Aqui estão as vantagens de sua prática:

- Na aparência, melhora a pele que fica mais hidratada e bonita, diminuindo os cravos e acnes; ocorre melhora no tônus muscular; ajuda a controlar o peso corporal e a combater o acúmulo de gordura; melhora a postura;
- Ajuda a manter ossos, músculos e articulações sadios;
- Adultos mais idosos se tornam mais fortes e mais capazes de se locomover sem o risco de quedas;
- Nota-se mais disposição no dia-a-dia para tarefas cotidianas, aumenta o fôlego e a capacidade para esforços físicos, o corpo fica mais flexível e alongado, melhora a auto-estima, e a alimentação e o sono se tornam melhores;
- No trabalho há um aumento da produtividade e diminuição do estresse e da indisposição;
- Reduz as sensações de depressão e ansiedade, melhorando o estado de humor e promovendo o bem-estar psicológico;
- Reduz as chances de desenvolver câncer;
- O sistema imunológico fica mais forte, há um aumento da qualidade e dos anos de vida e previne problemas como: doenças do coração,

hipertensão, obesidade, diabetes, deficiências respiratórias, colesterol, entre outros.

Um estudo mostrou que pessoas que possuem uma vida ativa têm metade dos riscos de mortalidade, além de possuírem menores riscos de desenvolverem doenças crônicas. A pesquisa ainda apontou que isso independe do sexo, idade, tabagismo, incapacidade funcional e comorbidades (doenças adicionais).



A pirâmide acima representa a diretriz da atividade física em sua base, e ao mesmo tempo limita a inatividade. Ela é usada inclusive em países

europeus em programas de promoção de saúde através da atividade física para todos!

Qualquer atividade física realizada por uma pessoa antes sedentária, trará benefícios em curto prazo, sendo este um bom argumento para mudanças nos hábitos de vida e obtenção de um melhor controle da saúde ou de doenças crônicas.

Então, aqui vão algumas dicas que devem ser lembradas e praticadas sempre:

- Suba e desça escadas em vez de usar o elevador;
- Quando for fazer compras ou ir a algum lugar próximo de casa, prefira ir a pé, e não de carro;
- Passeie com seu cachorro mais vezes, isso vai lhe ajudar e seu bicho de estimação também vai gostar;
- Aproveite os momentos de folga e fins de semana, não só para descansar mas também para passear, fazer caminhadas, em vez de ficar na frente da televisão por muito tempo.

Para você tabagista, iniciativas como esta irão ajudar a prevenir os efeitos da combinação entre inatividade física e tabagismo!

Então, CUIDE-SE e comece já a se mexer!!

Universidade Estadual de Londrina

Departamento de Fisioterapia

Laboratório de Fisioterapia Respiratória

Pesquisador responsável: _____Contato: ( )

_____

ANEXO C

Diário de Controle do Uso do Pedômetro

	DIA 1 _____	DIA 2 _____	DIA 3 _____	DIA 4 _____	DIA 5 _____	DIA 6 _____
Horário de Colocada (h: min)						
Número no visor **(manhã)**						
Horário de Retirada (h: min)						
Número no visor **(noite)**						
Tempo que retirou (banho, piscina,etc						
Obs						

LEMBRE: NÃO MUDE SUA ROTINA!

Departamento de Fisioterapia
Laboratório de Pesquisa em Fisioterapia Pulmonar

MANUAL DE INFORMAÇÕES

SOBRE O USO DO PEDÔMETRO

(Yamax DigiWalker® modelo SW200)

DIÁRIO DE
ATIVIDADE FÍSICA BASAL

Nome: _____

Data de Entrega: _____

Data do Retorno: _____

INSTRUÇÕES PARA O USO DO PEDÔMETRO

Prezado participante,

Este manual contém informações sobre o uso do **pedômetro,** um equipamento utilizado para quantificar o número de passos realizados por um indivíduo ao executar suas atividades diárias. A quantificação do número de passos permite saber se o indivíduo é suficientemente ativo para manter um estilo de vida saudável.

Muito obrigado por sua participação nesse estudo. Para que o estudo tenha sucesso, por favor, leia com atenção as instruções a seguir:

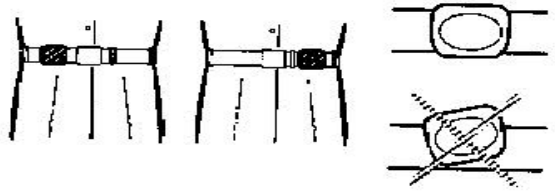
- O(a) senhor(a) irá usar o pedômetro por **6 dias consecutivos**;
- **Todas as manhãs** coloque o aparelho na cintura e **zere** o número no visor do pedômetro, utilizando o botão amarelo “reset” do aparelho;
- Retire o aparelho ao final do dia, quando for dormir, e **anote o número no visor;**
- **Somente** retire o pedômetro quando o(a) senhor(a) for tomar banho;
- **O pedômetro não pode ser molhado!**
- Não se esqueça de realizar as **anotações** no dia específico no diário;
- **Não mude seu padrão** normal diário de atividades e tente manter suas atividades o mais próximo do normal;
- Fique atento para a data de retorno.

Em caso de dúvida ou problema, favor entre em contato com:

Laboratório de Pesquisa: (43): 3371-2477

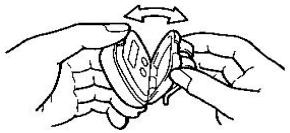
Como colocar o pedômetro?

Utilize o clipe para prender o pedômetro no cinto, calças ou saias, na altura da cintura. O pedômetro deve ficar do lado **esquerdo** e alinhado com o joelho. Certifique-se que o pedômetro está bem preso. Preste atenção para que a palavra “Digiwalker” não esteja de ponta cabeça. Para ter certeza do posicionamento correto do aparelho, compare com o desenho abaixo.



Como abrir o pedômetro?

Abra o pedômetro apenas quando ele estiver posicionado na cintura, caso contrário, pode danificá-lo.



Anotações no diário:

Anote no diário o horário de colocação e o número que consta no visor do pedômetro **(que deverá ser zero)**. Faça o mesmo à noite, quando retirar o pedômetro. Anote também o tempo que o(a) senhor(a) teve que retirar o pedômetro ao longo do dia. No campo “Observações”, anote alguma intercorrência ou atividade incomum que realizou naquele dia (por exemplo, exercício físico mais intenso).

Importante!

- ✓ Posicionar adequadamente o aparelho na cintura;
- ✓ Guardar o pedômetro em lugar seguro;
- ✓ Evitar choques ou peso em cima do aparelho;
- ✓ Evitar molhar o aparelho;