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**INTERVENÇÕES TERAPÊUTICO-OCUPACIONAIS EM INSTITUIÇÃO DE  
LONGA PERMANÊNCIA PARA IDOSOS**

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Escola de Educação Física, Fisioterapia e Terapia Ocupacional da UFMG

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Monografia apresentada ao Curso de Especialização de Terapia Ocupacional da Escola de Educação Física, Fisioterapia e Terapia Ocupacional da Universidade Federal de Minas Gerais, como requisito parcial à obtenção do título de Especialista em Terapia Ocupacional aplicada a Gerontologia.

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UNIVERSIDADE FEDERAL DE MINAS GERAIS  
ESCOLA DE EDUCAÇÃO FÍSICA, FISIOTERAPIA E TERAPIA OCUPACIONAL  
DEPARTAMENTO DE TERAPIA OCUPACIONAL

## FOLHA DE APROVAÇÃO

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**Trabalho de Conclusão de Curso aprovado**

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Coordenador Geral da Comissão Colegiada do  
Curso de Pós-Graduação Lato Senso  
“Especialização em Terapia Ocupacional” da  
UFMG

## RESUMO

O estudo de revisão de literatura por meio de busca eletrônica de artigos indexados nas bases de dados da biblioteca virtual de saúde, entre os anos de 2002 e 2009. Utilizando os seguintes descritores para a seleção dos artigos: "Homes for the Aged", "institutionalization" and "Occupational Therapy". Sete artigos foram selecionados para discussão. Os estudos apresentaram objetivos diversificados, como a estimulação e avaliação de funções cognitivas, da criatividade e da socialização; e a promoção da autonomia na mobilidade e nas atividades de vida diária. Os resultados indicam uma variedade de intervenções terapêuticas ocupacionais realizadas com idosos institucionalizados, sendo que os aspectos relacionados às funções cognitivas e físicas foram os mais abordados nos programas de intervenção.

Palavras-Chave: Idosos. Instituição de longa permanência. Intervenção. Terapia ocupacional.

## **ABSTRACT**

The review of literature through electronic search of articles indexed in the databases of the virtual library of health, between the years 2002 and 2009. Using the following keywords to select the articles: "Homes for the Aged", "institutionalization" and "Occupational Therapy". Seven articles were selected for discussion. The studies showed diverse goals, such as pacing and evaluation of cognitive function, creativity and socialization, and promotion of independence in mobility and activities of daily living. The results indicate a variety of therapeutic interventions performed with occupational institutionalized elderly, and that the issues related to physical and cognitive functions were the most addressed in intervention programs.

Keywords: Elderly. Homes for the aged. Intervention. Occupational therapy.

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## 1 INTRODUÇÃO

Os idosos, a velhice e o processo de envelhecimento humano ao longo da segunda metade do século 20 vêm adquirindo espaços cada vez maiores, alcançando um boom gerontológico na última década (PRADO; SAYD, 2004). O processo de envelhecimento populacional aconteceu primeiramente nos países desenvolvidos, e mais recentemente nos países em desenvolvimento. Atualmente este tema é um fenômeno muito discutido e preocupante, sendo um dos grandes desafios enfrentados pela saúde pública contemporânea (LIMA-COSTA; VERAS, 2003).

No Brasil, segundo Carvalho e Rodriguez-Wong (2008), o envelhecimento populacional ocorreu entre os anos 40 e 60, devido ao expressivo declínio da mortalidade e a manutenção dos altos índices de fecundidade. De acordo com Parahyba e Simões (2006), a partir do final dos anos 70 observou-se uma significativa redução do número de crianças e adolescentes na população em âmbito geral. Passando, então, a perceber uma maior concentração da população idosa.

O processo natural do envelhecimento é uma etapa da vida do homem que culmina com mudanças físicas, psicológicas e sociais acometendo particularmente cada indivíduo. Nessa fase o idoso reflete sobre os objetivos alcançados e sofre gradativamente perdas, das quais a saúde apresenta-se como a área mais afetada. Surgem experiências próprias e peculiares, decorrentes da trajetória de vida, podendo umas ter maior dimensão e complexidade que outras, integrando assim a formação do indivíduo idoso (MENDES *et al.*, 2005).

Algumas conseqüências geradas pelo processo de envelhecimento estão relacionadas a 1) questões da saúde como a maior demanda por assistência médica, a procura elevada pelos serviços de saúde, a permanência mais longa em hospitais e ao crescimento das despesas com medicamentos; 2) questões econômicas que abrangem alto número de indivíduos com menor auto-sustento, devido diminuição da renda e aumento dos gastos com a saúde; e 3) questões sociais que englobam a ampliação da convivência familiar de idosos por mais gerações, o maior número de mulheres na população devido a sua elevada



longevidade, acarretando assim, um dos grandes impactos sociais, que é a institucionalização (ZIMERMAN, 2000).

As grandes síndromes geriátricas e as profundas mudanças sociais como a urbanização e a alteração na estrutura familiar, que diminuem a capacidade da família para prestar cuidado ao idoso, se revelam como fatores precipitantes da institucionalização (BORN; BOECHAT, 2006).

Quanto à institucionalização Chaimowicz e Greco (1999) enfatizam que o processo de inclusão do idoso em uma Instituição de Longa Permanência se dá de acordo com a necessidade de reabilitação intensiva entre a alta hospitalar e o retorno ao domicílio, a ausência temporária do cuidador domiciliar, estágios finais de doenças e alto grau de dependência. Segundo Araujo e Ceolim (2007), quando o idoso é transferido da sua casa para a instituição fica propenso a desenvolver quadros de depressão, de perda de contato com a realidade, de confusão, de despersonalização, de isolamento e de afastamento social.

Por outro lado, a instituição de longa permanência é um local de geração de significados que compõe um cenário repleto de simbolismos, de rotinas, de costumes, de crenças e de novos rituais. Para entender os diversos significados deste cenário é necessário ouvir, observar e interpretar considerando as diferentes visões culturais que, muitas vezes, penetram de modo imperceptível nas atividades cotidianas dos profissionais que trabalham com idoso (LENARDT *et al.*, 2006). Freitas e Noronha (2010) acrescentam que estes locais são repletos de histórias de vida marcadas por impressões positivas e negativas sobre o que é ser idoso.

Para que os idosos residentes em ILPI's recebam assistência indispensável a sua saúde é necessária a formação de uma equipe multiprofissional com intervenção direta no processo do envelhecimento, incentivando a manutenção das habilidades funcionais em todas as áreas de desempenho, com enfoque de maior independência, autonomia e qualidade de vida (PEREIRA, 2005).

O terapeuta ocupacional é um dos profissionais que integra esta equipe de atenção ao idoso. Tem como instrumento a atividade e auxilia o sujeito na

elaboração das formas de organização, nas atividades cotidianas, no estabelecimento de vínculos, e na formação de pontes com a família, com a comunidade e com outras dimensões das redes sociais (LIBERMAN, 2002). Barreto e Tirado (2006) complementam que assistência ao idoso proporcionada pela terapia ocupacional tem como princípio a manutenção, restauração e melhora da capacidade funcional por meio de intervenções com atividades mais direcionadas e significativas em todas as áreas de desempenho ocupacional.

A partir do exposto este estudo objetivou identificar as intervenções terapêuticas ocupacionais realizadas nas Instituições de Longa Permanência e discutir seus efeitos nos idosos residentes.

## 2 METODOLOGIA

Este trabalho de revisão de literatura foi realizado por meio de busca eletrônica de artigos indexados nas bases de dados da biblioteca virtual de saúde entre os anos de 2002 e 2009. Utilizando como estratégia de busca os seguintes descritores para a seleção dos artigos: "Homes for the Aged", "institutionalization" and "Occupational Therapy".

Com a combinação dos descritores "Homes for the Aged" and "Occupational Therapy" foram encontrados 80 artigos, que após a leitura inicial do título e resumo, foram selecionados três artigos disponíveis na base eletrônica de dados MEDLINE.

Com a combinação dos descritores "institutionalization" and "Occupational Therapy" foram encontrados 40 artigos, que após a leitura inicial do título e resumo, foram selecionados dois artigos disponíveis na base eletrônica de dados LILACS e dois artigos disponíveis na base eletrônica de dados MEDLINE.

Os critérios de inclusão utilizados para seleção inicial da amostra foram: artigos nacionais e internacionais, que abordavam o tema proposto e possuíam resumo disponível na base de dados.

Assim, a população do estudo foi composta por uma amostra de sete artigos uma vez que atenderam as variáveis de interesse, relatando sobre possíveis intervenções gerontológicas realizadas pelos terapeutas ocupacionais em instituições de longa permanência.

### 3 RESULTADOS

Os resultados serão apresentados no quadro a seguir.

trabalho e ano de publicação	Objetivo	Tipo de estudo	Amostra	Tipo e duração da intervenção	Resultados
CARDOSO, Adnaldo P. et al. Oficina de som e movimento: um espaço de intervenção terapêutica ocupacional, 2002.	Aumentar a atividade, a criatividade, a expressão e a integração dos idosos; investigar o efeito das atividades desenvolvidas na promoção da socialização e avaliar o envolvimento e a aderência deles nestas atividades.	Estudo de caso	Dez idosos, de ambos os sexos, com idade entre 55 e 94 anos, com interesse pela música e pela dança, que vivem em uma instituição filantrópica de longa permanência no município de Belo Horizonte, MG, Brasil.	Oficina de som e movimento que abordou atividades como: dinâmicas de entrosamento, movimentação ativa das articulações; alongamentos; exercícios de respiração e relaxamento; caminhadas simuladas; exercícios de ritmo e improvisação; canto, dança e tocar instrumentos. Foram realizadas 15 sessões de Terapia Ocupacional ao longo de quatro meses, uma vez por semana.	Os resultados do estudo demonstram que as intervenções contribuíram para uma mudança na capacidade dos idosos de se expressarem corporal e verbalmente de forma mais criativa. Além disso, possibilitou aos idosos compartilhar suas experiências, contar suas histórias de vida e relatar e retomar atividades do seu passado ocupacional, viabilizando assim um maior conhecimento de cada indivíduo, uma revelação de habilidades e um incremento da criatividade e do entrosamento. Os idosos se apresentavam mais desinibidos, comunicativos e espontâneos se comparado às primeiras oficinas. O mesmo progresso pôde ser observado em relação à realização de movimentos que foram, gradativamente, ganhando maior amplitude. O incentivo feito pelos coordenadores à participação dos idosos na condução das diferentes atividades da oficina estimulou a sensação de utilidade e também assumir no grupo um papel diverso do habitual. A aderência pôde ser avaliada através da alta frequência dos idosos ao longo das 15 oficinas. As atividades foram realizadas na instituição onde os idosos residiam, o que facilitou o acesso ao local. Apesar das interferências ambientais, os idosos mostraram-se envolvidos nas atividades, permanecendo até o fim de cada oficina e algumas vezes diziam que o tempo havia passado rápido sem que percebessem. Ao concluir a última oficina, os idosos se dirigiam aos coordenadores manifestando a satisfação pelo trabalho realizado.

<p>HAGEN, Brad et al. On a happier note: validation of musical exercise for older persons in long-term care settings, 2003.</p>	<p>Analisar os efeitos físicos, emocionais, comportamentais e cognitivos de um programa de terapia por exercício musical após a intervenção e 10 semanas depois.</p>	<p>Estudo quase-experimental</p>	<p>Sessenta idosos, de ambos os sexos (40 mulheres e 20 homens) com idade média de 73,8 anos, de três instituições de longa permanência, do Reino Unido. Para eliminar o risco de contaminação foram recrutados 20 idosos de uma mesma instituição para grupo controle (sem intervenção), 20 idosos de outra instituição para grupo de comparação (intervenção da terapia ocupacional) e 20 idosos de uma terceira instituição para grupo de intervenção (exercício de movimento musical).</p>	<p>Programa de exercício de terapia musical. O grupo controle recebeu tratamento padrão. O grupo de comparação recebeu intervenção da terapia ocupacional incluindo atividades como: artesanato (bordados, arte, tapeçaria, etc), atividades sociais (jogos de cartas, bingo, etc) e atividades de vida diária (cozinha, limpeza, etc). E o grupo de intervenção recebeu exercícios de movimentos musical dos anos 1920, 1930 e 1940 com ênfase no alongamento, flexibilidade e atividade aeróbica leve. Foram realizadas intervenções ao longo de dois meses e meio, sendo três vezes por semana.</p>	<p>Com relação às medidas psicológicas relacionada às habilidades cognitivas, pode-se observar que no grupo controle estas diminuíram e dos grupos de Terapia Ocupacional e de exercício musical registraram aumento imediatamente após os programas. Ocorreu um aumento nos problemas comportamentais no grupo controle, já os grupos de Terapia Ocupacional e de exercício musical registraram diminuição imediatamente após os programas. O índice de satisfação da vida ficou aproximadamente os mesmos ao longo do tempo para os grupos controle e de Terapia Ocupacional. Já o grupo de exercício musical registrou um aumento imediatamente após o programa de exercício. Com relação às medidas físicas, o grupo controle experimentou declínio gradual da função, enquanto os grupos de Terapia Ocupacional e de exercício musical experimentaram diferentes padrões. O grupo de Terapia Ocupacional manteve a mesma pontuação com relação ao equilíbrio e o grupo de exercício musical experimentou uma melhora durante a intervenção. Com relação à flexibilidade das articulações, o grupo controle experimentou um declínio e os dois outros grupos perceberam melhorias significativas. Todas as medidas diminuíram após 10 semanas do término do programa. Assim os resultados do estudo demonstram que tanto o grupo de Terapia Ocupacional quanto o grupo de exercício musical registram uma melhora nas competências cognitivas, comportamentais e físicas dos idosos. No entanto, os programas de exercício musical parecem ter o benefício adicional na</p>
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<p>BELLOMO, Fleurange et al. The advantages of occupational therapy in oral hygiene measures for institutionalised elderly adults, 2005.</p>	<p>Incorporar um terapeuta ocupacional durante a atividade de escovação dentária e da prótese e promover a autonomia na execução das atividades de vida diária.</p>	<p>Estudo randomizado controlado</p>	<p>Sessenta e um idosos, de ambos os sexos (44 mulheres e 17 homens), com idade média de 85,7 anos (entre 72 e 97 anos), que vivem em uma instituição de longa permanência, em Genebra. Os idosos foram separados em grupo controle e grupo experimental, e divididos em assistidos e independentes</p>	<p>Programa de intervenção sobre a atividade de vida diária (higiene bucal). O grupo experimental independente recebeu instrução profissional da escovação de dentes e próteses. O grupo experimental assistido recebeu instruções iniciais da terapia ocupacional na escovação de dentes e próteses seguida de acompanhamento semanal e se necessário reeducação. O grupo controle independente não recebeu nenhuma intervenção após avaliação. O grupo controle assistido recebeu intervenção semanais de manicure pela mesma terapeuta ocupacional. Foram realizadas intervenções semanais ao longo de três meses.</p>	<p>Os resultados do estudo demonstram que dos movimentos individuais ensinados e acompanhados pela terapeuta ocupacional, a abertura de um tubo de creme dental e a escovação da prótese passaram a ser realizadas de forma mais independente. Tanto a intervenção da escovação com a atividade placebo levou a uma melhoria significativa na higiene oral e da prótese.</p>
<p>NASCIMENTO, Valéria P. et al. Grupo de leitura e produção de textos: uma intervenção da terapia ocupacional, 2007.</p>	<p>Estimular as funções cognitivas (incluindo a atenção, a concentração e a memória), a criatividade, a iniciativa e a orientação espaço-temporal; e promover a interação entre os idosos.</p>	<p>Estudo de caso</p>	<p>Nove idosos com comprometimento cognitivo leve, de ambos os sexos (sete mulheres e dois homens), com idade entre 73 e 86 anos, que tinham interesse pela leitura e escrita, que vivem em uma instituição de longa permanência do município de Belo Horizonte, MG, Brasil</p>	<p>Programa de leitura e produção de textos que abordou as seguintes atividades: promoção de interação entre idosos; orientação espaço-temporal; leitura de textos disponibilizados pelas terapeutas; produção de textos; leitura dos próprios textos; apresentação das produções através de um mural; e construção de álbum. Foram realizadas 21 sessões de Terapia Ocupacional ao longo de quatro meses, duas vezes por semana.</p>	<p>Os resultados do estudo demonstram que as intervenções contribuíram para a promoção de mudanças em diversos desfechos clínicos. Foi observada melhora na interação social entre os participantes, que passaram a conversar de forma mais espontânea e frequente durante as sessões e também em outros horários; os idosos apresentaram mais atentos e concentrados durante as intervenções e com participação mais ativa, ilustrando possíveis mudanças na atenção, concentração, memória e na iniciativa e maior espontaneidade com relação às primeiras sessões. Ao final dos encontros,</p>

<p>CHRISTOFOLE TTI, Gustavo et al. A controlled clinical trial on the effects of motor intervention on balance and cognition in institutionalized elderly patients with dementia, 2008.</p>	<p>Analisar os efeitos de duas intervenções sobre a cognição e equilíbrio de idosos institucionalizados com demência mista.</p>	<p>Estudo randomizado controlado</p>	<p>Cinquenta e quatro idosos institucionalizados com demência mista, de estágio moderado, com idade média de 74,3 anos, de ambos os sexos, com prevalência de mulheres em todos os grupos. Os idosos foram separados em três grupos, sendo que</p>	<p>Programa de intervenção sobre a cognição e o equilíbrio. O grupo 1 (interdisciplinar) foi realizado cinco vezes por semana, duas horas por dia. As sessões de fisioterapia foram individuais e concentrou-se em exercícios específicos cinesioterapêutico que estimulou força, equilíbrio e cognição, como atenção concentrada, o reconhecimento, a memória imediata, memória de trabalho e práxis. O terapeuta ocupacional realizou atividades em grupo, por meio de atividades artísticas e</p>	<p>foi observada maior espontaneidade dos participantes diante das propostas apresentadas, em comparação com as primeiras sessões. Os idosos adquiriram maior autonomia e independência na leitura, interpretação, elaboração e redação de textos, solicitando cada vez menos o auxílio da coordenadora, sobretudo nas últimas sessões, nas quais não foi necessário fornecer nenhum auxílio. Ao longo do processo, os idosos foram estimulados a exercitar a criatividade e passaram a escrever de forma mais livre, criativa e poética. Observou-se ainda maior expressão de sentimentos, uma vez que eles compartilharam fatos significativos e experiências de vida. Os participantes foram também estimulados a desenvolver estratégias para a realização das atividades propostas e mostraram maior compromisso com o grupo e preocupação com o resultado dos textos. Os elogios das outras pessoas possibilitaram a satisfação pessoal, o aumento da auto-estima e do sentimento de utilidade.</p>
				<p>Os resultados do estudo que demonstraram benefícios relacionados ao equilíbrio dos idosos em ambos grupos 1 e 2 em comparação ao grupo 3. Com relação à função cognitiva não foi possível indicar benefícios entre o grupo 1 e 3 e grupo 2 e 3. A falta de consenso quanto ao tipo de atividade complica a análise dos benefícios da intervenção do motor. No presente estudo, os grupos 1 e 2 foram semelhantes no que diz respeito às intervenções, que se caracterizaram, sobretudo, por exercícios específicos cinesioterapêutico associado com estimulação cognitiva. Considerando que os grupos 1 e 2 são semelhantes e</p>	

<p>SACKLEY, Catherine M. et al. Effects of a physiotherapy and occupational therapy intervention on mobility and activity in care home residents:</p>	<p>Avaliar a eficácia clínica de um programa de fisioterapia e terapia ocupacional contra o tratamento padrão no atendimento de residentes do lar de idosos com</p>	<p>Estudo randomizado controlado</p>	<p>Duzentos e quarenta e nove idosos, com vários tipos de comorbidades, de ambos os sexos, residentes em 24 instituições de longa permanência, de Birmingham, Reino Unido. Sendo</p>	<p>Programa de intervenção sobre a mobilidade e atividade de vida diária. O grupo experimental recebeu intervenção da fisioterapia visou melhorar a mobilidade e a capacidade de realizar atividades da vida diária de forma independente, e componentes abordados, tais como força, flexibilidade, equilíbrio e tolerância ao exercício. E a</p>	<p>grupo 1 foi assistido por um programa interdisciplinar que incluía fisioterapia, terapia ocupacional e educação física; o grupo 2 apenas intervenções da fisioterapia; e o grupo 3 considerado como controle.</p>	<p>artesanato (quadros, pinturas, desenhos e bordados) que associavam a coordenação motora com exercícios de cognição. Já o educador físico realizou intervenções em grupo, para desenvolver os componentes de capacidade funcional através de sessões de caminhada comumente associada aos exercícios de membros superiores e inferiores para estimular a força, equilíbrio, coordenação motora, agilidade, flexibilidade e resistência aeróbia. O grupo 2 (fisioterapia) foi realizado três vezes por semana, uma hora por dia através dos mesmos exercícios cinesioterapêuticos usado com o grupo 1. O grupo 3 (controle) não recebeu nenhuma intervenção. Foram realizadas intervenções num período de seis meses.</p>	<p>foram sujeitos a intervenções com os mesmos objetivos, mas difere no que diz respeito ao número de profissionais e de atividades, podendo inferir um aspecto particular. Foi verificado que houve uma diminuição da queda em alguns domínios cognitivo em um grupo em comparação com o grupo 3, especialmente no saque do Teste do Relógio e do teste de Fluência Verbal Semântica. Esta diminuição poderia ter sido potencializado pela associação da intervenção motora com o alargamento das redes sociais que resultaram da intervenção no grupo 1. No entanto, o mesmo resultado não foi observado na comparação dos grupos 2 e 3. Assim, após seis meses de intervenção interdisciplinar e de fisioterapia observou-se melhora no equilíbrio de idosos institucionalizados com demência. Embora a cognição global não melhorou notou-se vantagens na intervenção interdisciplinar relacionada a dois domínios: fluência verbal (medido pelo Teste de Fluência Verbal) e funções executivas (medido pelo relógio Teste de Desenho). Mesmo com algumas limitações, os resultados permitem inferir que os exercícios aplicados em contextos diferentes podem ter resultados positivos para as pessoas em um estágio moderado de demência mista.</p>	<p>Os resultados do estudo demonstraram que após de três meses de intervenção de fisioterapia e terapia ocupacional não foram eficazes para promover uma mobilidade e vida independente entre os residentes do lar comparada aos que obtiveram o tratamento padrão. A intervenção baseou-se em "melhores práticas" abordagens desenvolvidas de acordo com evidências clínicas e opiniões de especialistas.</p>
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<p>a cluster randomised controlled trial, 2009.</p>	<p>limitações de mobilidade, que são dependentes de cuidadores em algumas atividades da vida diária.</p>	<p>Estudo de Caso</p>	<p>que 128 idosos, com idade média de 86 anos, foram selecionados para o grupo de intervenção da fisioterapia e terapia ocupacional e 121, com idade média de 84 anos, para o grupo controle.</p>	<p>intervenção terapia ocupacional visou melhorar a independência nas atividades da vida diária, tais como alimentação, vestuário, banheiro, tomar banho, e transferir (por exemplo, da cama para a cadeira). O grupo controle recebeu tratamento padrão. Foram realizados três meses de intervenções. O número médio de visitas da fisioterapia foi de 6,4 por habitante, com um tempo de contato total média de 2,21 horas por habitante. E o número médio de visitas da Terapia Ocupacional foi de 9,8 por habitante, com um tempo de contato médio total de 3,6 horas por residente.</p>	
<p>WANG, Rosalie H. et al. Power Mobility for a Nursing Home Resident With Dementia, 2009.</p>	<p>Avaliar o resultado de uma intervenção da terapia ocupacional através de uma cadeira de rodas elétrica com poder anticolisão para permitir a auto-mobilidade de um residente do lar de idosos com demência, facilitando a sua participação social.</p>	<p>Estudo de Caso</p>	<p>Um homem de 83 anos com comprometimento físico e cognitivo, residente em uma instituição de longa permanência de Toronto, Ontário.</p>	<p>Programa de intervenção sobre a mobilidade, realizando adaptação ambiental, através da cadeira de rodas elétrica, para compensar as limitações pessoais e modificar os elementos que influenciam o desempenho participação social do idoso. Foram realizadas 12 sessões, com duração de uma hora aproximadamente, durante quatro semanas.</p>	<p>Os resultados do estudo demonstraram que o idoso foi incapaz de operar a cadeira de rodas de forma independente, pois necessitava de apoio contínuo para utilizá-la, mas observou-se que as intervenções forneceram um impacto positivo no afeto e na participação social. Durante as sessões, o idoso passou a subir com o pessoal, iniciar saudações, passou a observar o que os outros estavam fazendo, ouvi-los falar e fazer piadas. O idoso foi capaz de usar o botão de energia, fazer avançar de forma contínua, e virar à direita, à esquerda, e 180°. Assim, a cadeira de rodas com poder anticolisão, embora projetado para evitar colisões, foi incapaz de compensar a diminuição de sua iniciação, planejamento motor, e novas aprendizagens.</p>

## 4 DISCUSSÃO

Dos sete estudos selecionados dois foram publicados em língua portuguesa e cinco em língua inglesa, e abordaram distintas intervenções terapêutico-ocupacionais em instituição de longa permanência para idosos.

Os objetivos dos estudos eram diversificados, incluindo a estimulação e avaliação de funções cognitivas, da criatividade e da socialização (CHRISTOFOLETTI *et al.*, 2008; NASCIMENTO *et al.*, 2007; HAGEN *et al.*, 2003; CARDOSO *et al.*, 2002); e a promoção da autonomia na mobilidade e nas atividades de vida diária (SACKLEY *et al.*, 2009; WANG *et al.*, 2009; BELLOMO *et al.*, 2005). Essa diversidade de objetivos dificulta uma comparação mais aprofundada.

Em relação à metodologia, dos sete estudos selecionados, três eram estudos randomizados controlados (BELLOMO *et al.*, 2005; CHRISTOFOLETTI *et al.*, 2008; SACKLEY *et al.*, 2009); um estudo quase-experimental (HAGEN *et al.*, 2003); e três estudos de caso (CARDOSO *et al.*, 2002; NASCIMENTO *et al.*, 2007; WANG *et al.*, 2009).

A amostra do estudo variou de um (WANG *et al.*, 2009) a 249 idosos (SACKLEY *et al.*, 2009), com idade mínima de 55 anos (CARDOSO *et al.*, 2002) e idade máxima de 97 anos (BELLOMO *et al.*, 2005). Os estudos foram compostos por idosos de ambos os sexos (CARDOSO *et al.*, 2002; HAGEN *et al.*, 2003; BELLOMO *et al.*, 2005; NASCIMENTO *et al.*, 2007; CHRISTOFOLETTI *et al.*, 2008; SACKLEY *et al.*, 2009), e no estudo de caso que incluiu um idoso, este era do sexo masculino (WANG *et al.*, 2009). Destaca-se o predomínio do sexo feminino (HAGEN *et al.*, 2003; BELLOMO *et al.*, 2005; NASCIMENTO *et al.*, 2007; CHRISTOFOLETTI *et al.*, 2008).

Com relação aos procedimentos realizados foram identificados cinco tipos de intervenção, listadas a seguir:

1. Programa de exercícios utilizando música (CARDOSO *et al.*, 2002; HAGEN *et al.*, 2003);
2. Programa de leitura e produção de textos (NASCIMENTO *et al.*, 2007);

3. Programa de intervenção nas atividades de vida diária (BELLOMO *et al.*, 2005; SACKLEY *et al.*, 2009);
4. Programa de estimulação da cognição e do equilíbrio (CHRISTOFOLETTI *et al.*, 2008);
5. Programa de intervenção na mobilidade (WANG *et al.*, 2009; SACKLEY *et al.*, 2009).

As intervenções tiveram duração mínima de um mês (WANG *et al.*, 2009) e máxima de seis meses (CHRISTOFOLETTI *et al.*, 2008). Os recursos utilizados nas intervenções também foram variados: música, leitura, exercícios físicos e cognitivos. O desenvolvimento dos programas incluiu somente o terapeuta ocupacional em alguns estudos (CARDOSO *et al.*, 2002; HAGEN *et al.*, 2003; BELLOMO *et al.*, 2005; NASCIMENTO *et al.*, 2007; WANG *et al.*, 2009) e em outros estudos, mais de um profissional, como por exemplo, pelo terapeuta ocupacional e pelo fisioterapeuta (SACKLEY *et al.*, 2009) e ainda pelo terapeuta ocupacional, pelo fisioterapeuta e pelo educador físico (CHRISTOFOLETTI *et al.*, 2008). Essa diversidade nos períodos de duração da intervenção, nos recursos e na equipe de profissionais foi um fator relevante que dificultou a comparação dos programas.

O programa de exercícios com música foi utilizado por Cardoso *et al.* (2002) e Hagen *et al.* (2003), em que abordaram atividades com ênfase em alongamentos, estimulação da flexibilidade e atividade aeróbica leve estimulando a coordenação motora e o ritmo. Segundo Miranda e Godeli (2003) a atividade física com música pode estabelecer um contexto positivo e agradável desenvolvendo uma intervenção apropriada para que os idosos continuem em atividade. A música tem um papel importante para o sucesso das sessões de exercícios, sendo assim, é significativo efetuar uma seleção musical que favoreça o prazer de estar naquele ambiente e para a motivação durante a realização da atividade (MIRANDA; GODELI, 2002). No estudo de Hagen *et al.* (2003), constatou-se que os idosos tiveram melhora nas competências cognitivas, comportamentais e físicas, além um benefício adicional na melhoria do equilíbrio, da flexibilidade e da satisfação com a vida. No estudo de Cardoso *et al.* (2002) também foi observado além do progresso na competência física, relacionada a amplitude de movimento, e na satisfação pessoal, uma

mudança na capacidade dos idosos de se expressarem corporal e verbalmente de forma mais criativa, melhora na comunicação, entrosamento e participação social.

Bellomo *et al.* (2005), desenvolveram um programa de intervenção nas atividades de vida diária com ênfase na higiene bucal. Os movimentos individuais foram ensinados e acompanhados pela terapeuta ocupacional e passaram a ser realizadas de forma mais independente pelos idosos. A atividade de vida diária também foi um dos focos de Sackley *et al.* (2009), com intervenções direcionadas a melhorar a independência na alimentação, vestuário, higiene, banho e transferência, por exemplo, da cama para a cadeira. Destaca-se que a intervenção não atingiu o objetivo de promover uma vida independente.

Sackley *et al.* (2009) e Wang *et al.* (2009) realizaram um programa de intervenção na mobilidade. Em ambos os estudos as intervenções foram incapazes de gerar uma independência aos idosos. O diferencial observado no estudo de Wang *et al.* (2009) foi que as intervenções forneceram um impacto positivo no afeto e na participação social.

Christofoletti *et al.* (2008) desenvolveram um programa de estimulação da cognição e do equilíbrio, no qual foi observada melhora do equilíbrio mas não em relação à cognição global, embora tenham sido apontados ganhos na fluência verbal e funções executivas.

No estudo de Nascimento *et al.* (2007), que desenvolveu um programa de leitura e produção de textos, foram destacados vários benefícios incluindo a cognição. Com a utilização do programa de leitura e produção de textos notou-se uma melhora na interação social entre os idosos, apresentando-se mais atentos e concentrados durante as intervenções, com participação mais ativa e mudanças na atenção, concentração, memória e na iniciativa. Os idosos adquiriram maior autonomia e independência na leitura, interpretação, elaboração e redação de textos, escrevendo de forma mais livre, criativa e poética. Percebeu-se ainda uma maior expressão de sentimentos, maior compromisso com o grupo e preocupação com o resultado dos textos. Os elogios das outras pessoas possibilitaram a satisfação pessoal, o aumento da auto-estima e do sentimento de utilidade.

Os diversos estudos sinalizaram resultados positivos em diferentes funções como cognição, comportamento, equilíbrio, mobilidade, comunicação, participação social, atividades de vida diária - higiene bucal -, fluência verbal e funções executivas (CARDOSO *et al.*, 2002; HAGEN *et al.*, 2003; BELLOMO *et al.*, 2005; NASCIMENTO *et al.*, 2007; CHRISTOFOLETTI *et al.*, 2008; WANG *et al.*, 2009). Porém as intervenções propostas por SACKLEY *et al.* (2009) e Wang *et al.* (2009) nas atividades de vida diária e na mobilidade não alcançaram os resultados esperados.

Os resultados positivos, relacionadas à mobilidade, nos diferentes estudos foram: melhoria do equilíbrio (HAGEN *et al.*, 2003; CHRISTOFOLETTI *et al.*, 2008); melhoria da flexibilidade (HAGEN *et al.*, 2003); aumento da amplitude de movimento (CARDOSO *et al.*, 2002) e maior independência na realização das atividades de vida diária (BELLOMO *et al.*, 2005).

Quanto à cognição, os resultados positivos foram: melhora da atenção, concentração, iniciativa (NASCIMENTO *et al.*, 2007); e da memória (CARDOSO *et al.*, 2002; NASCIMENTO *et al.*, 2007).

## **5 CONCLUSÃO**

Portanto, pode-se concluir que as intervenções terapêutico-ocupacionais em instituições de longa permanência para idosos apontaram resultados importantes nos diversos estudos selecionados, mas a diversidade de recursos utilizados, as diferenças de tempo de desenvolvimento do programa, a variação na equipe de trabalho e no perfil dos idosos participantes impede uma generalização das conclusões e demanda estudos mais aprofundados sobre o tema.

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## OFICINA DE SOM E MOVIMENTO: UM ESPAÇO DE INTERVENÇÃO TERAPÊUTICA OCUPACIONAL \*

## WORKSHOP OF SOUND AND MOVEMENT: A SPACE OF INTERVENTION THERAPEUTIC OCCUPATIONAL

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CARDOSO, A. P.; FREITAS, L. C. TIRADO, M. G. A. Oficina de som e movimento: um espaço de intervenção terapêutica ocupacional. *Rev. Ter. Ocup. Univ. São Paulo*, v. 13, n. 2, p. 51-5, maio/ago. 2002.

**RESUMO:** O presente artigo tem por objetivo descrever o efeito da intervenção terapêutica – oficina de som e movimento na criatividade, na expressão e na socialização de idosos institucionalizados, bem como avaliar o envolvimento e a aderência destes às atividades propostas. A oficina foi realizada em uma instituição de longa permanência em Belo Horizonte, MG, Brasil. Ao término das 15 oficinas foi possível observar uma mudança na capacidade de expressão corporal e verbal dos idosos e uma maior interação entre eles com estabelecimento de novas relações pessoais e com o ambiente.

**DESCRITORES:** Idoso. Institucionalização. Assistência a idosos. Oficinas de trabalho protegido. Terapia ocupacional/tendências.

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### INTRODUÇÃO

Os idosos são o segmento que mais tem crescido não só na população mundial como também no Brasil. Estimativas elaboradas pelas Nações Unidas apontam que em 2020 existirão cerca de 1,2 bilhão de idosos no mundo (MARTIN; KINSELLA, 1994).

O envelhecimento populacional no Brasil tem

gerado novas demandas na área da saúde com o crescimento das doenças crônico-degenerativas, na área econômica com as despesas com a seguridade social e necessidade de uma rede de apoio para cuidar e tratar da população idosa. Isto requer reformas das políticas públicas visando adequá-las às novas demandas sociais. Acrescido a este contexto, observa-se ainda uma crescente

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procura por instituições de longa permanência para idosos. Segundo Neto (1986), essas instituições possuem dupla função social: a primeira, a de abrigar e cuidar das pessoas desamparadas e impossibilitadas de viverem junto à família e à comunidade; e a segunda, a de servir como lócus socialmente aprovado de segregação de seres humanos cuja produtividade econômica e representação social foram considerados esgotados pelo sistema social. Desta forma, o asilamento surge, muitas vezes, como uma alternativa para a solução de problemas sociais, econômicos e familiares.

Piloto et al. (1998) observam que, no processo de institucionalização, os procedimentos de normatização das atividades diárias e de disciplina quase sempre dificultam a preservação da individualidade e do espaço do indivíduo. Dentre os problemas institucionais Vieira (1996) destaca o tédio, a monotonia, a solidão, o isolamento e o desconsolo de uma rotina sem perspectivas. Tais fatores emergem, acentuando a dependência e a inatividade dos idosos. Frente a esta realidade institucional, uma intervenção se faz necessária, permitindo ao idoso conservar sua atividade, sua autonomia e sua identidade.

A atividade propicia ao idoso experienciar fatores importantes para seu bem-estar como significado existencial, auto-determinação, desenvolvimento positivo e qualidade de vida (DEPS, 1993). A atividade segundo Liberman (1998), atua como facilitadora da expressão e da comunicação, dando à pessoa oportunidade de criar algo a partir de sua cultura, de seus conhecimentos e de sua história passada, possibilitando a percepção da individualidade, da existência de diferentes formas de expressão e de outras maneiras de agir e sentir.

Neste contexto das instituições, as oficinas podem ser um dispositivo importante para reverter o quadro de apatia e isolamento dos idosos e auxiliá-los a alcançar e manter uma vida mais saudável e independente. As oficinas, um dos espaços utilizados pela terapia ocupacional, podem ser, como afirma Carvalho (1994), um lugar adequado e livre para proporcionar a seus participantes um aumento na liberdade de relação, um convívio mais saudável, um espaço de socialização e possibilidade de expressão e criação. Como o corpo do indivíduo “fala”, expressando o que sente e expondo estados intrapsíquicos, a oficina pode se tornar “um espaço de conhecimento e reconhecimento”, onde a pessoa poderá “criar, experimentar, trocar e refletir acerca de sua capacidade afetiva, expressiva e laborativa” (NICK, 1997, p.516-7). O som e o movimento se apresentam, portanto, como recursos terapêuticos úteis, possibilitando trabalhar a capacidade

expressiva do corpo, auxiliando o indivíduo no seu processo de auto-conhecimento (PAUL; RAMSEY, 2000). Para Fregtman (1989), integrar a música à terapia é integrar o corpo, é buscar no corpo os gestos e as posturas como engrenagens da história pessoal.

O trabalho em uma Oficina de som e movimento permite ao indivíduo criar, individualmente e com os outros, movimentos e sons, relatar ações e emoções, desenvolvendo uma melhor percepção de si e dos outros (CREA, 1982; NICK, 1997).

A partir destas possibilidades de trabalho, que a Oficina oferece, um estudo foi realizado com um grupo de idosos, do município de Belo Horizonte, tendo como objetivo aumentar a atividade, a criatividade, a expressão e a integração dos idosos; investigar o efeito das atividades desenvolvidas na promoção da socialização e avaliar o envolvimento e a aderência deles nestas atividades.

## MATERIAL E MÉTODOS

A Oficina de som e movimento foi realizada em uma instituição filantrópica de longa permanência no município de Belo Horizonte, MG, Brasil.

O grupo foi composto por dez participantes, de ambos os sexos, com idades entre 61 e 94 anos, mas cabe destacar que fez parte deste grupo um senhor de 55 anos. Foram selecionados idosos que manifestaram, em seu histórico ocupacional, interesse pela música e pela dança, e foi critério de exclusão a presença de patologias como: retardo mental severo, demência em fase avançada e surdez total.

A Oficina de som e movimento foi desenvolvida uma vez por semana, com duração de uma hora e trinta minutos totalizando, ao longo de quatro meses, 15 oficinas. As atividades não ofereciam riscos para os participantes, sendo os exercícios apropriados para idosos e conduzidos de forma segura, respeitando-se as possibilidades de cada indivíduo.

Todas as oficinas foram criteriosamente documentadas através de relatórios e, a partir do material coletado, foi feita uma análise qualitativa, discutindo-se o desempenho dos participantes, com base nas informações fornecidas por eles e na observação das relações estabelecidas no grupo.

Neste trabalho foram utilizados nomes fictícios visando-se preservar a identidade dos participantes.

## ATIVIDADES DESENVOLVIDAS

Nas oficinas, visando-se a uma estruturação dinâmica das atividades e, conseqüentemente, a um

melhor envolvimento e participação dos idosos, foi proposta a seguinte seqüência: abertura, aquecimento, deslocamento no espaço, exercícios de ritmo e improvisação, espaço livre e encerramento.

Durante as oficinas os participantes foram observados quanto à capacidade de expressão corporal e verbal, criatividade, socialização, bem como interesse e assiduidade. Essas observações foram registradas ao longo das quinze oficinas, sendo relatadas a seguir algumas das atividades realizadas.

### **Abertura**

As oficinas se iniciavam em círculo, com a apresentação de cada um dos participantes, buscando-se um melhor conhecimento e interação do grupo (YOZO, 1996).

Uma das dinâmicas realizadas foi escolher um dos vários objetos - lenço, ferramentas de jardinagem, instrumentos musicais, dentre outros - que estavam no centro do círculo e depois se apresentar e dizer o porquê da escolha de tal objeto. As escolhas revelaram demandas, desejos, necessidades, preferências, aptidões e lembranças. Sr. Aldo, 83 anos, ao pegar um lenço vermelho, amarrou-o no pescoço lembrando-se de quando participara de um grupo de revolucionários por ocasião do governo do presidente Artur Bernardes. Este relato suscitou outras lembranças que puderam ser partilhadas no grupo.

Em outra dinâmica, os participantes formaram duplas e relataram algum acontecimento de suas vidas que gostariam de compartilhar. Essa dinâmica possibilitou exercitar o ouvir, o reter informação e o comunicar o conteúdo da mensagem recebida, além de estreitar o relacionamento entre eles.

### **Aquecimento**

O objetivo do aquecimento era a mobilização ativa das articulações, estimular a flexibilidade e o equilíbrio dinâmico. Ao som de uma música ritmada, realizavam movimentos variados com as articulações.

Nas primeiras oficinas observou-se que os idosos realizavam os exercícios de forma tímida e com pequena amplitude de movimento. A partir da sexta oficina no entanto, observou-se modificação no padrão de movimentação, uma vez que os participantes passaram a realizar os exercícios de forma segura, mais expressiva e com maior amplitude.

Alice, 63 anos, portadora de artrite reumatóide e hemiplegia esquerda, durante os exercícios de aquecimento passou a mobilizar os membros plégicos

com auxílio da mão preservada. Essa atitude espontânea de Alice estimulou os demais participantes que, diferentemente dela, não apresentavam nenhuma limitação física para a realização da atividade.

Na seqüência das atividades foram realizados exercícios de respiração e de relaxamento, ao som de uma base musical suave. Nas primeiras oficinas o relaxamento era dirigido pelos coordenadores e, a partir da sétima oficina, dois dos participantes, Aldo e Lourdes, se alternaram nesta tarefa.

Os relaxamentos eram realizados após o aquecimento e antes do deslocamento no espaço, tornando-se uma ocasião também de pausa e retomada de forças em preparação para a atividade física seguinte.

### **Deslocamento no espaço**

Esta atividade visava à estimulação da criatividade e da mobilidade, através de caminhadas simuladas, no próprio espaço da oficina. Os participantes se movimentavam ao som de um fundo musical ou instrumento de percussão que ritmava o deslocamento.

Nas primeiras oficinas percebeu-se que, durante esse exercício, o grupo tinha a tendência de caminhar em círculo um atrás do outro. Procurou-se, então, incentivá-los a buscar um caminho próprio.

Uma caminhada livre marcou o deslocamento da sétima oficina que se configurou em dois momentos distintos. No primeiro, enquanto os idosos caminhavam, foi introduzida uma sonoplastia que remetia ao trânsito de uma grande cidade. Durante este momento, os participantes andaram mais depressa, fazendo comentários como se estivessem no centro da cidade. No segundo momento, enquanto ainda caminhavam, a sonoplastia foi mudada para sons da natureza. Após rirem um pouco e diminuir o ritmo da caminhada, começaram a se cumprimentar como se faz, segundo eles, na roça. Foram muitas as lembranças que, de forma descontraída e espontânea, puderam ser partilhadas no grupo. Este partilhar de lembranças com pessoas da mesma faixa etária possibilitou, ao longo das oficinas, estreitar as relações, aumentar a expressão verbal, a criatividade, melhorando a convivência.

### **Exercícios de ritmo e improvisação**

Esta atividade possibilitava a estimulação da criatividade e da expressão corporal, além da estimulação da memória recente, da atenção e da coordenação motora. Nesses exercícios foram explorados desde o acompanhar o ritmo da música com

palmas, até criá-los com o próprio corpo, com algum objeto ou instrumento de percussão como: cocos, cabaças, vagens secas, pandeiro e chocalhos. Em alguns momentos foi possível a subdivisão do grupo, realizando assim dois ritmos diferentes simultaneamente e um “diálogo rítmico”: emissão de som por um grupo e resposta pelo outro.

Paulo, 66 anos, um idoso assíduo às oficinas, caracterizava-se pela timidez e retraimento. Em uma das atividades rítmicas, escolheu tocar pandeiro. Sua habilidade com o instrumento foi logo percebida, chegando a causar admiração dos demais participantes. A possibilidade de um retorno a uma atividade há muitos anos desenvolvida estimulou a sua participação com o pandeiro em outros momentos da oficina, quer cadenciando o deslocamento no espaço, quer acompanhando o violão e a sanfona no momento reservado à expressão livre dos participantes.

### **Espaço livre**

Foi comunicado aos idosos que esse espaço era um momento reservado à manifestação espontânea, podendo cantar, dançar, tocar, contar um caso, enfim, fazer o que quisessem. A partir de então, José, 67 anos, passou a trazer o seu violão, seguido por Jonas, 94 anos, com a sua sanfona que já há algum tempo permanecia empoeirada sobre o guarda-roupa. A pedido do grupo passaram a executar diversas músicas. Tocavam também forró, o que estimulava a constituição de pares para dançar.

Mesmo os idosos que não sabiam tocar, cantar ou dançar foram estimulados a participarem trazendo fitas cassetes ou CDs de seu cantor predileto para apresentar ao grupo. Alguns participaram recitando poesias, fazendo orações, dizendo mensagens e pensamentos. Esse espaço possibilitou ao grupo mais um momento de expressão, de criatividade, de interação e de retomada da atividade musical por parte de alguns participantes.

### **Encerramento**

Ao final de cada oficina era solicitado aos participantes que comentassem as atividades e apresentassem suas sugestões e críticas. Nestes momentos, poucos idosos se manifestavam e, mesmo estes, se detinham a relatar a sua motivação e interesse por alguma atividade particular naquele dia.

A atitude pouco reivindicativa e crítica pode ser atribuída a uma rotina institucional marcada pelo tédio, pelo isolamento e pela falta de autonomia.

Embora somente quatro idosos manifestassem

suas motivações e interesses, o espaço foi mantido durante todas as oficinas.

## **DISCUSSÃO**

Ao término das 15 oficinas, analisando o percurso do grupo, pode-se observar que as atividades propostas e as intervenções dos coordenadores contribuíram para uma mudança na capacidade dos idosos de se expressarem corporal e verbalmente de forma mais criativa. Além disso, possibilitou aos idosos compartilharem suas experiências, contar suas histórias de vida e relatar e retomar atividades do seu passado ocupacional, viabilizando assim um maior conhecimento de cada indivíduo, uma revelação de habilidades e um incremento da criatividade e do entrosamento.

Com o desenvolvimento das oficinas, aos poucos, os idosos se apresentavam mais desinibidos, comunicativos e espontâneos se comparado às primeiras oficinas. O mesmo progresso pôde ser observado em relação à realização de movimentos que foram, gradativamente, ganhando maior amplitude. Tais observações puderam ser constatadas no decorrer das oficinas sobretudo nas atividades de Aquecimento, Deslocamento no espaço e Ritmo e Improvisação.

Um dos fatores importantes a relatar refere-se ao incentivo feito pelos coordenadores à participação dos idosos na condução das diferentes atividades da oficina. Foi notável o envolvimento do grupo e a satisfação de Aldo, 83 anos, e Lourdes, 68 anos, ao final dos relaxamentos conduzidos por eles. Acredita-se que este espaço aberto à participação ativa tenha significado uma possibilidade a mais para estarem se sentindo úteis e também assumirem no grupo um papel diverso do habitual.

A aderência pôde ser avaliada através da frequência dos idosos ao longo das 15 oficinas. Dos 10 participantes, seis apresentaram uma frequência de 100%, dois de 90%, um de 80% e um de 60%. Vale ressaltar que as atividades eram realizadas na instituição onde os idosos residiam, o que facilitava o acesso ao local. Por outro lado, ao serem convidados para participarem da oficina, era dito a cada idoso que esta era uma atividade de livre escolha e que poderiam se retirar quando desejassem.

No entanto, observou-se que, apesar de o local ser aberto, com interferência de sons da cozinha e eventual circulação de funcionários, os idosos mostravam-se envolvidos nas atividades, permanecendo até o fim de cada oficina e algumas vezes diziam que o tempo havia passado rápido sem que percebessem. Ao concluir a última oficina, os idosos se dirigiram aos coordenadores manifestando a satisfação pelo trabalho realizado.

## CONSIDERAÇÕES FINAIS

Diante dos resultados obtidos e da evolução dos idosos participantes, a realização de uma Oficina pode representar uma possibilidade de intervenção frente a alguns problemas institucionais como a inatividade, a insociabilidade e a apatia. Problemas que interferem diretamente na saúde e na qualidade de vida dos idosos asilados.

Cabe também destacar que a estrutura e a

dinâmica das atividades proporcionaram ao grupo possibilidades de expressão, de um maior conhecimento do próprio corpo e de suas capacidades, assim como o estabelecimento de novas relações pessoais e com o ambiente.

Assim, pensando nos desafios atuais das instituições geriátricas e naqueles previstos pelas estatísticas demográficas, as oficinas podem se tornar um recurso economicamente viável e uma forma relevante de intervenção junto à população idosa.

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CARDOSO, A. P.; FREITAS, L. C.; TIRADO, M. G. A. Workshop of sound and movement: a space of intervention therapeutic occupational. **Rev. Ter. Ocup. Univ. São Paulo**, v. 13, n. 2, p. 51-5, maio/ago. 2002.

**ABSTRACT:** The present article has for objective to describe the effect of the therapeutic intervention – Workshop of sound and movement in the creativeness, in the expression and at the socialization of institutionalized elderlies and to appreciate their involvement and the adhesion to the proposed activities. The workshop was realized at a long permanency institution in Belo Horizonte, MG, Brazil. At the end of the 15 workshop it was possible to observe a change at the elderlies capacity of corporal and verbal expression, and a major interaction among them with the settlement of new personal relationships and with the environment.

**KEYWORDS:** Aged. Institutionalization. Old age assistance. Sheltered workshops. Occupational therapy/trends.

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## On a happier note: validation of musical exercise for older persons in long-term care settings

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### Abstract

This paper describes a quasi-experimental study of a musical exercise intervention to improve the physical, cognitive, behavioral status and life satisfaction of older residents in a long-term care facility in the United Kingdom. Twenty long-term care residents from three different units ( $n = 60$ ) were recruited and assigned to one of three groups: a control (C) group (no intervention), an occupational therapy (OT) group (comparison group) and a music exercise group (intervention group). Assessments of physical and cognitive status were made pre-intervention and repeated at the end of the 10-week exercise program and again 10 weeks after the completion of the program. The results show that both OT and exercise participation is associated with improvement in physical and cognitive function. However, the exercise group showed significant improvement in more areas than the OT group. The functional benefits from OT and exercise were not sustainable after these activities ceased and showed significant decline 10 weeks after the end of the programs. © 2003 Elsevier Science Ltd. All rights reserved.

**Keywords:** Exercise; Elderly; Long-term care; Occupational therapy; Rehabilitation

### 1. Introduction

Population aging, coupled with increases in the prevalence of such chronic diseases as heart disease and dementia, has brought attention to the increasing demand for long-term care in many industrialized countries. Given the projected demands for long-term care, researchers, caregivers and policy-makers alike are showing greater interest in finding ways to prevent or delay the need for long-term care of older persons. One such way may well be the more vigorous promotion of physical exercise.

Shephard (1985, 1990), for example, has argued that many elderly people get placed in long-term care facilities due to a deterioration of functional capacity,

secondary to physical inactivity—and that regular physical activity can delay the need for institutional placement by 10–20 years. Although this pre-institutionalization loss of physical capacity in older persons—reflected in the gradual loss of the ability to do simple daily tasks such as dressing, climbing stairs, and rising from chairs—may be common, the loss of physical capacity due to inactivity can become even greater once the person is actually living in a long-term care facility. Thus, residents are left with an *iatrogenic* induced inactivity and increased dependency on those who care for them (Miller, 1985).

Given the numerous and well-documented benefits of exercise in the community dwelling elderly (Clark et al., 1991; Wolinsky et al., 1995), and the important role exercise plays in maintaining physical capacity and independent functioning, researchers have also been interested in the use of exercise to prevent, slow or reverse the increase in inactivity and dependency

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associated with institutionalization. A variety of studies looking at the physical effects of exercise on older persons in long-term care, while varying in kinds of exercise, methodology and outcome variables, have found a clear association between exercise and such outcomes as muscle strength, joint flexibility, functional mobility and self-care (Connelly and Vandervoort, 1995, 1996; Evans, 1995; Karl, 1982; McMurdo and Rennie, 1994; Schnelle et al., 1996; Vitti et al., 1993). Collectively, these studies tend to suggest that exercise may help to minimize or reverse the trajectory of decreased function and increased dependency that many older persons develop upon admission to a long-term care facility.

Importantly, research also suggests that exercise may also have cognitive benefits for older persons living in long-term care facilities. Studies such as the work by Dawe and Moore-Orr (1995), and others reviewed by Netz and Jacob (1994) and Van Sickle et al. (1996), demonstrate that improvements in cognitive function occur among older persons immediately following an exercise session. Thus it would appear that physical activity does have some arousal effect on cognition, particularly in the short term. The exact cause of the improved cognitive function is not known, although Tomporowski and Ellis (1986) have suggested that the positive effects of exercise on cognition are physiological and related to increased heart rate and blood flow. As well, improved cognitive function could also be due to the increased social interaction and participation associated with group exercise programs. Whether or not there are long-term benefits associated with the use of exercise programs for long-term care residents remains to be seen (Netz and Jacob, 1994).

Despite the evidence documenting the physical and psychological benefits of exercise for older persons in long-term care, a number of important research questions remain unanswered. For example, we do not have an accurate picture of what happens to the physical and cognitive capacity levels of older persons once the exercise programs stop. In addition, despite the well-documented benefits of exercise for older persons, most studies reflect the optional nature of exercise programs in long-term care facilities. In other words, unlike the dispensing of medications in long-term care—which are considered essential and ‘ordered’ by the physician—exercise programs in long-term care are seen as optional, and their benefits can be seriously constrained by the problems of low attendance (Prochaska and Marcus, 1994; Shephard, 1990; Topp and Sabol Stevenson, 1994).

## 2. Aim

Given the aforementioned gaps in the research literature, the aim of this study was to examine the

physical, emotional, behavioral and cognitive effects of a physician-endorsed, 10-week program of musical exercise therapy on a group of long-term care residents, both immediately and 10 weeks after the 10-week exercise program had ended.

## 3. Methods

### 3.1. Research design

The protocol and selection of subjects was developed in consultation with staff to meet the primary objective of the study and achieve a high level of compliance by participants. The researchers used a quasi-experimental, pre-test, post-test design, with two treatment groups (exercise therapy [ET] or occupational therapy [OT]), and a third control (C) group (see Fig. 1). The research project was reviewed and received ethics approval from a Human Subjects Review Committee at the University of Lethbridge, Alberta, Canada.

### 3.2. Sample and setting

Subjects were recruited from three, 30-bed wards in a long-term care facility in the United Kingdom. Twenty residents from three separate units were non-randomly allocated to the ET, OT or C groups. Subjects were assigned in such a way that those placed in the ET group came from the same unit, as did the participants in the OT and C groups, thus eliminating any risk of contamination. Residents were excluded as eligible for the study if they had severe cognitive impairment (as defined by a CAPE [Pattie and Gilleard, 1979] score greater than 18), had difficult and socially disruptive behaviors, or were deemed to be too medically unstable for the exercise program.

Residents were recruited, in collaboration with the two physicians with primary responsibility for the three units, until 20 residents agreed to participate in each of the three wards. In the case of the OT and exercise groups, physicians wanted to give residents an enthusiastic message of support for participation in the respective programs. That is, while residents were given complete freedom to decline participation in the therapy, the physicians not only explained the program(s) (and their evaluation) to the residents, but also encouraged the residents to consider their participation in such therapy as an important contributor to their overall well-being—much in the same way that many residents considered their taking of medications, or going to physiotherapy. If and when residents agreed to participate in one of the two therapy programs, the research evaluation of the therapy programs was also explained to them, and verbal consent was obtained if they wished to participate. A similar consent process was

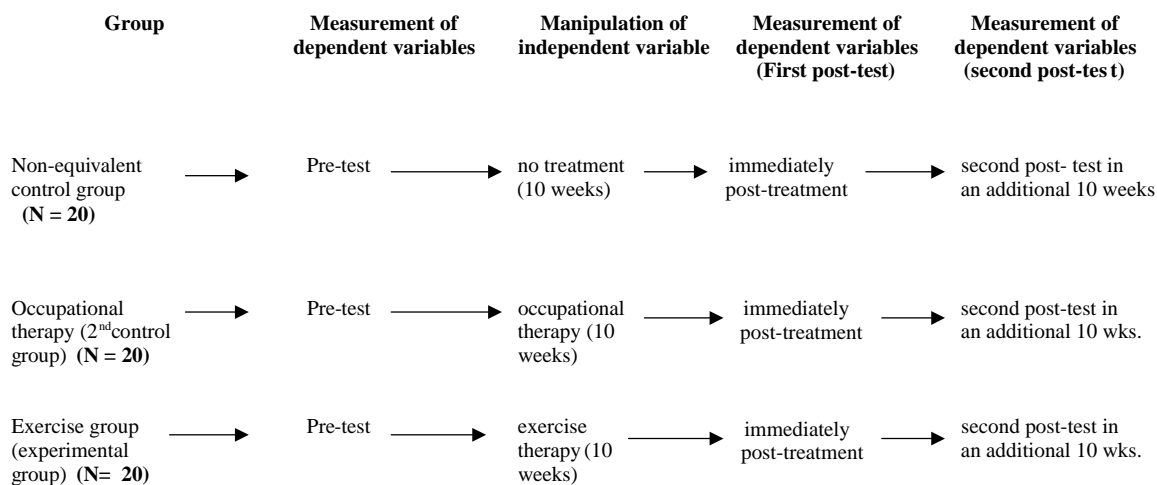


Fig. 1. Research design.

used for those residents in the control unit. Study recruitment continued until 20 residents from each of the three, 30 resident units had given consent to participate in the study. Sixty-eight percent of the 60 residents finally participating in the study were female, and the average age of residents was 78.3 years.

### 3.3. Description of treatments

#### 3.3.1. Control group

Residents of the first unit, which served as the comparison group, received no unique treatment, other than normal and routine nursing care.

#### 3.3.2. Occupational therapy group

Residents of the second unit, which also served as a form of comparison group, received occupational therapy. This treatment was included as a comparison to help determine if improvements in the exercise group, particularly in cognition, might be simply due to increased social interaction and stimulation. Residents of the 'occupational therapy' unit received a 1-h OT program three times per week for a total of 10 weeks. The program was delivered by an occupational therapist, and included a variety of crafts (needlework, art, rug making, etc.), social activities (card games, bingo, etc.), and daily living activities (cooking, grooming, etc.).

#### 3.3.3. Musical movement exercise group

Residents of the third unit received a treatment program of musical movement exercise. The exercise program consisted of 40-min sessions, three times per week, for a total of 10 weeks. The exercise program was adapted from a musical movement exercise program developed by a local YMCA for seniors, such that participants could complete the program entirely from

wheelchairs or chairs if need be. The program consisted primarily of movements to music from the 1920s, 1930s and 1940s, with an emphasis on stretching, flexibility and mild aerobic activity.

#### 3.3.4. Methods of measurements

A variety of measurements were made to assess potential impacts of the exercise program on residents' cognitive status, behavioral difficulties, life satisfaction, balance, and joint functioning. Unless indicated otherwise, a team of two research assistants hired and trained for this particular study completed all measurements.

#### 3.3.5. Cognitive assessment scale (CAS)

The CAS, part of the Clifton Assessment Procedure for the Elderly (CAPE) (Pattie and Gilleard, 1979), is a short test to evaluate the existence and degree of impairment in mental functioning. It is composed of the following sub-tests: information and orientation, counting from 1 to 20, reciting the alphabet, a reading list, and a psychomotor skill test (the Gibson Spiral Maze). A higher score in the CAS indicates higher cognitive functioning.

#### 3.3.6. Behavior rating scale (BRS)

The BRS, also a subscale of the CAPE, was used as an assessment of a number of functional areas including activities of daily living. The BRS scale is scored to provide an overall measurement of the individual's behavioral disability level. The test consists of 18 questions on either a three- or four-point scale to evaluate physical dependency, apathy, communication difficulty and social disturbance, with higher scores indicating higher levels of dependency and/or behavioral difficulty. The BRS was completed by a caregiver (i.e.



nurse) with close knowledge of the individual resident's level of functional ability (Pattie and Gilleard, 1979).

### 3.3.7. Overall dependency scores (ODS)

An ODS was arrived at by adding the CAS and BRS scores together, as per the standard scoring of the CAPE (Pattie and Gilleard, 1979).

### 3.3.8. Life satisfaction index (LSI)

Part A of the LSI was used to assess overall life satisfaction. The LSI was chosen to measure the possible emotional benefits of exercise. Although previous research has failed to find changes in affect due to exercise in older persons in long-term care (Netz and Jacob, 1994), research has demonstrated an increase in contentment with nursing home life as a result of participation in exercise programs (Ruuskanen and Parkatti, 1994), so the LSI seemed an appropriate measure for this study. Part A has 20 statements that are really statements about life in general. A research assistant administered the LSI to participants, by reading them statements to which they indicated that they either 'agreed', 'disagreed' or 'didn't know' if they agreed with the statement.

### 3.3.9. Physical assessment

Balance and joint range and function were measured according to average mobility standards developed by the Committee for the Study of Joint Motion of the American Academy of Orthopedic Surgeons (1965). Balance was measured in the number of seconds the subject could stand on one foot. For those unable to stand, balance was measured in the number of seconds the subject could balance a book on his/her head, while moving their head slowly back and forth. For both balance measurements, the average was taken of two timed trials. Table 1 lists the various places of joint range and function were measured using a goniometer (joint flexion and extension), grip strength meter (grip strength), or tape measure (spinal flexion and extension).

## 4. Results

### 4.1. Data analysis

All data was presented as cell means for each of the three groups (C, OT and ET) at each of the three data collection periods. The SPSS computer statistical package (ANOVA) was used to test for statistically significant interactions between group and time of assessment.  $P < 0.05$  was considered statistically significant.

Table 1  
Range of motion/strength measurements

General area of body	Specific joint function measured
Fingers, hands and wrists	Right thumb flexion
	Left thumb flexion
	Right digit flexion
	Left digit flexion
	Right thumb extension
	Left thumb extension
	Right wrist extension
	Left wrist extension
	Right grip strength <sup>a</sup>
	Left grip strength <sup>a</sup>
Elbows, shoulder and spine	Right elbow flexion
	Left elbow flexion
	Right elbow extension
	Left elbow extension
	Right shoulder backward extension
	Right should forward flexion
	Left shoulder backward extension
	Left shoulder forward flexion
	Left shoulder rotation
	Right shoulder rotation
Spine flexion	
Spine extension	
Ankles, knees and hip	Right ankle flexion
	Right ankle extension
	Left ankle flexion
	Left ankle extension
	Right knee flexion
	Right hip flexion
	Left knee flexion
	Left hip flexion

<sup>a</sup> Measured with grip strength meter.

### 4.2. Results of data analysis

#### 4.2.1. Psychological measures

As can be seen in Fig. 2, residents' cognitive abilities (as measured by the CAS) decreased in the C group at both post-tests, whereas the OT and exercise groups experienced increases in cognitive abilities immediately after the 10-week programs, and a slight decline 10 weeks after the programs ended. A significant interaction was found between group and time of assessment ( $F(2, 144) = 19.16, p < 0.001$ ), indicating that the results of the cognitive assessments differed depending upon the group and the time of measurement.

A similar pattern was found for both the behavioral rating scale (BRS) and the overall dependency scores

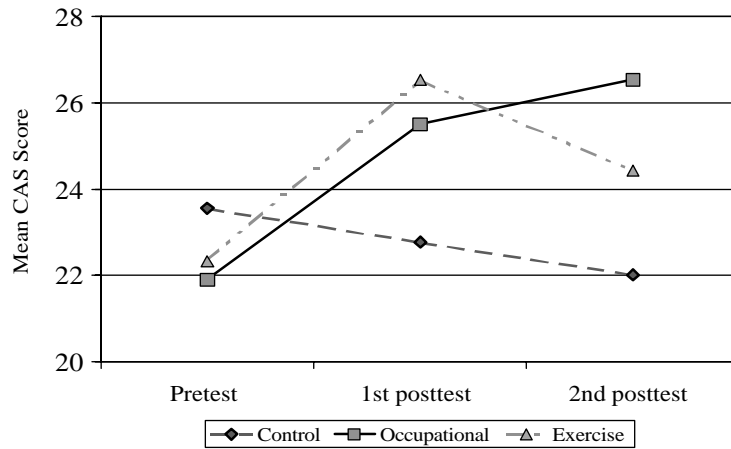


Fig. 2. Mean score for CAS by program and assessment.

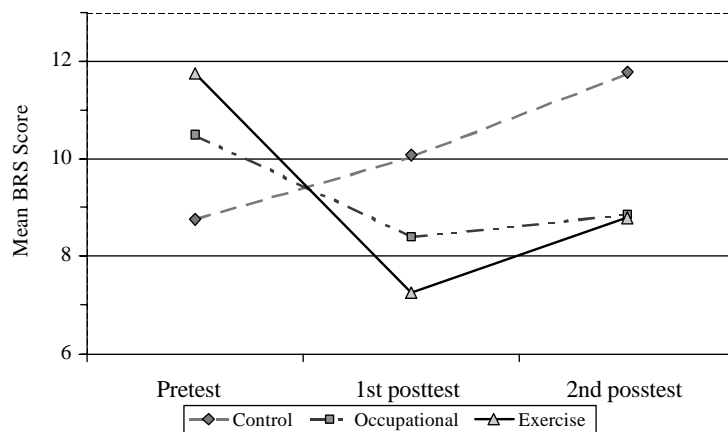


Fig. 3. Mean score for BRS by program and assessment.

(ODS). As can be seen in Fig. 3, behavioral problems increased in the C group over the testing period, whereas the OT groups and exercise group experienced a decrease in behavioral problems immediately after the programs, and a subsequent increase 10 weeks after the programs ended. Again, a statistically significant interaction was found between group and time of assessment ( $F(4, 114) = 18.27, p < 0.001$ ). The same statistically significant interaction for group and time was found for overall dependency scores ( $F(4, 114) = 19.38, p < 0.001$ ).

LSI scores followed a slightly different pattern (Fig. 4). LSI scores stayed at approximately the same levels across time for the C and OT groups.

However, the exercise group experienced an increase in LSI scores immediately after the exercise program, followed by a decrease in LSI scores 10 weeks after the end of the program. These changes in LSI scores reflect a statistically significant interaction LSI scores between

group and time of assessment ( $F(4, 114) = 4.11, p < 0.019$ ).

#### 4.2.2. Physical measures

The effects of the various groups on physical measures can be divided into balance, and the three general body areas presented in Table 1: fingers, hands and wrists; elbows, shoulder and spine; and ankles, knees and hip. For both balance and all of the three general body areas, a pattern emerged whereby the C group experienced gradual decline in function over the three time periods. Different patterns emerged over time, however, for the OT and exercise groups.

In terms of balance, the OT group maintained the same balance scores over time. The exercise group, however, experienced an improvement in balance immediately after the exercise program, followed by a very slight decline 10 weeks after the end of the program (Fig. 5). Reflecting these differences, a statistically

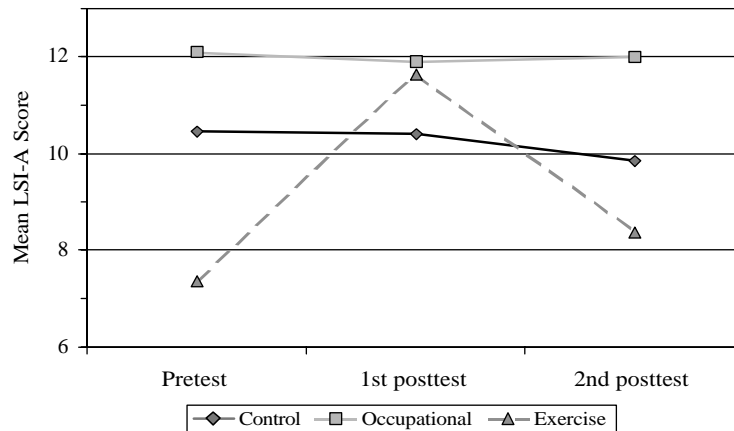


Fig. 4. Mean Score for LSI-A by program and assessment.

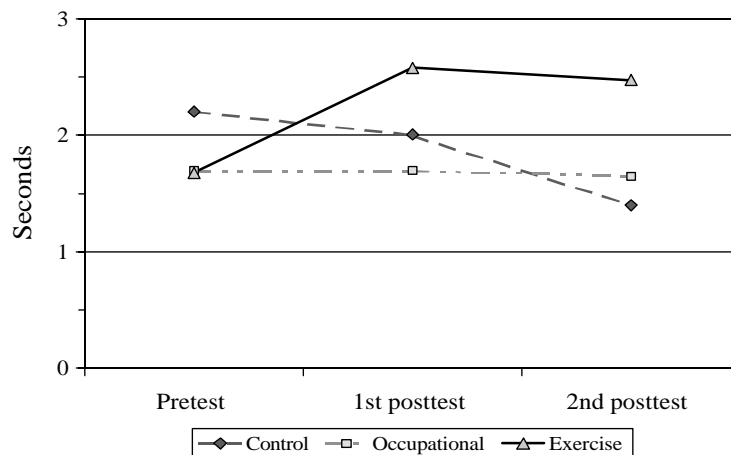


Fig. 5. Balance (standing) by program and assessment.

significant interaction was found between the groups and time of assessment ( $F(2, 114) = 4.52, p < 0.013$ ).

The various results pertaining to fingers, hands and wrists are presented in Table 2. While C group members experienced a decline in finger, hand and wrist function over time, both the OT groups and exercise group members generally saw equal and statistically significant improvements in finger, hand and wrist function immediately after involvement with their programs, followed by declines in function 10 weeks subsequent to the end of their programs.

A different pattern emerged for the results pertaining to elbow, shoulder and spine function, which are presented in Table 3. As before, the control saw mostly declines in function in these areas over time, but the OT and exercise groups saw different patterns of change. While the OT group improved their function in one or two areas (e.g., left elbow flexion), it was predominantly the exercise group that saw improvements in elbow, shoulder and spine function. Once again, many of these

improvements in function had partially reversed themselves 10 weeks after the exercise program had concluded.

Yet another pattern of differences in joint function improvements developed between the C, OT and exercise groups with relation to for ankle, knee and hip function (see Table 4). In this case, both the C and OT groups declined in function during the three measurement periods. The exercise group, however, showed improvements in ankle, knee and hip function. Once again, these improvements declined somewhat after the exercise program had stopped.

## 5. Conclusion

### 5.1. Major findings

Overall, this study lends further support to the findings of previous studies showing that exercise can

Table 2  
Cell means for joint function: fingers, hands and wrists

		Control	Occupational	Exercise	<i>F</i> value for group by time interaction	Significance value
Right thumb flexion	Pre-test	14.95	29.30	28.95	30.68	0.00
	1st post-test	20.90	11.20	14.00		
	2nd post-test	26.30	21.60	22.89		
Left thumb flexion	Pre-test	11.85	31.25	28.05	25.29	0.00
	1st post-test	17.20	15.05	13.47		
	2nd post-test	23.45	13.47	24.16		
Right digit flexion	Pre-test	2.21	3.44	3.27	26.94	0.00
	1st post-test	2.66	2.27	2.27		
	2nd post-test	3.13	2.83	2.94		
Left digit flexion	Pre-test	2.55	3.54	3.11	20.30	0.00
	1st post-test	2.91	2.45	2.24		
	2nd post-test	3.17	3.02	2.67		
Right thumb extension	Pre-test	15.03	14.11	14.06	47.67	0.00
	1st post-test	14.26	15.35	15.61		
	2nd post-test	13.71	14.72	14.74		
Left thumb extension	Pre-test	14.55	14.24	13.95	26.97	0.00
	1st post-test	13.88	15.50	15.54		
	2nd post-test	13.40	15.11	14.82		
Right wrist extension	Pre-test	57.35	44.55	49.63	16.93	0.00
	1st post-test	52.45	58.65	61.79		
	2nd post-test	47.70	49.85	56.21		
Left wrist extension	Pre-test	59.75	45.85	48.42	21.73	0.00
	1st post-test	55.40	59.35	60.05		
	2nd post-test	51.40	57.20	55.21		
Right grip strength	Pre-test	12.65	8.22	8.37	33.23	0.00
	1st post-test	11.30	13.95	11.29		
	2nd post-test	10.00	11.89	10.34		
Left grip strength	Pre-test	10.95	7.88	7.83	43.56	0.00
	1st post-test	9.80	13.80	10.37		
	2nd post-test	8.75	11.85	9.67		

have significant physical and cognitive benefits for institutionalized older adults. In particular, the findings from this study suggest that compared to a C group, institutionalized older participants in a musical exercise program experienced significant improvements in balance, joint flexibility, cognitive abilities, behavioral ratings, and life satisfaction.

This particular study was able to add some comparatively unique components that may further aid our understanding about the use of exercise in long-term care facilities for the aged. To begin with, this study incorporated not only a standard control group but also made use of second control group, an OT group. This allowed for the assessment of unique outcomes associated with exercise programs compared to occupational therapy/skill training programs, which have previously been found to improve functional status in institutionalized older persons, even those with a dementia (Tappen, 1994). Importantly, the findings from this study suggest that older residents in long-term care enjoy a number of

the same benefits from an occupational therapy program as they would be an exercise program.

Specifically, compared to the standard control group, both OT and exercise participants experienced significant improvements in cognitive abilities, difficult behaviors, finger/hand/wrist flexibility, and elbow/shoulder/spine flexibility. However, only the participants in the exercise program experienced improvements in life satisfaction, balance and ankle/knee/hip flexibility. This pattern of similarities and differences between outcomes in the occupational therapy and exercise programs begin to make sense when one considers the nature of the two programs. As both programs involve social interaction, mental stimulation and meaningful activities, it is not surprising that both programs resulted in increases in cognitive abilities and behavior ratings. As both programs also involve use of fine and gross upper body movements, it stands to reason that both programs might be associated with improvements in fingers/hand/wrist and elbow/shoulder flexibility. The fact that the

Table 3  
Cell means for joint function: elbows, shoulders and spine

		Control	Occupational	Exercise	<i>F</i> value for group by time interaction	Significance value
R. elbow flexion	Pre-test	148.35	138.25	140.84	49.89	0.00
	1st post-test	143.40	147.30	153.32		
	2nd post-test	140.75	144.65	146.58		
L. elbow flexion	Pre-test	150.70	139.85	137.32	44.70	0.00
	1st post-test	146.95	148.40	153.37		
	2nd post-test	140.25	146.70	148.00		
R. elbow extension	Pre-test	12.15	3.70	14.21	32.16	0.00
	1st post-test	14.15	14.35	8.00		
	2nd post-test	15.25	14.85	12.21		
L. elbow extension	Pre-test	13.90	6.05	13.74	32.81	0.00
	1st post-test	15.65	14.75	7.42		
	2nd post-test	16.75	14.45	12.05		
R. shoulder backward extension	Pre-test	67.55	61.20	63.79	14.00	0.00
	1st post-test	63.20	64.90	77.21		
	2nd post-test	59.15	62.80	70.74		
R. shoulder forward extension	Pre-test	146.20	132.85	127.58	18.72	0.00
	1st post-test	140.35	133.20	144.89		
	2nd post-test	135.60	131.25	136.84		
L. shoulder backward extension	Pre-test	65.35	62.95	61.11	16.70	0.00
	1st post-test	60.80	60.70	74.74		
	2nd post-test	55.60	58.60	68.26		
L. shoulder forward flexion	Pre-test	140.00	141.25	129.74	26.83	0.00
	1st post-test	132.75	136.80	130.30		
	2nd post-test	126.95	149.05	140.37		
L. shoulder rotation	Pre-test	47.95	40.90	29.42	41.23	0.00
	1st post-test	44.15	38.80	40.42		
	2nd post-test	40.80	33.65	37.63		
R. shoulder rotation	Pre-test	48.50	39.70	32.53	36.13	0.00
	1st post-test	44.90	37.60	47.26		
	2nd post-test	41.10	33.75	41.63		
Spine flexion	Pre-test	46.15	46.76	43.79	16.96	0.00
	1st post-test	45.85	46.76	44.77		
	2nd post-test	45.20	46.66	44.67		
Spine extension	Pre-test	41.48	41.95	41.58	1.58	0.19
	1st post-test	41.30	41.73	41.68		
	2nd post-test	41.33	41.68	41.90		

exercise program also involved some lower-body movement and a variety of exercises and activities helps to explain why improvements in balance and ankle/knee/hip flexibility were seen in the exercise group alone. Why improvements in life satisfaction scores were unique to the exercise group alone is a bit unclear at this point, although it may have something to do with the fact that participants described the exercise group as the most 'fun' of the two programs, with the musical component of the program being particularly appreciated. Alternatively, the improvements in life satisfaction could be a spurious finding, given the fact that the exercise group

appeared to have unusually low pre-test life satisfaction scores compared to the other two groups.

Secondly, this study was unique in the sense that it also provided information about the *sustainability* of exercise benefits—that is, what happened to the benefits participants enjoyed from exercise programs 10 weeks after the program had ended. Importantly, with only one or two exceptions (e.g., balance), nearly all the improvements seen in the exercise group at the immediate end of the exercise program had decreased substantially by the time the second post-test had been completed, approximately two and half months later.

Table 4  
Cell means for joint function: ankles, knees and hips

		Control	Occupational	Exercise	F Value for group by time interaction	Significance value
Right ankle flexion	Pre-test	86.80	79.65	72.84	25.79	0.00
	1st post-test	80.95	73.65	84.32		
	2nd post-test	76.60	71.05	79.82		
Right ankle extension	Pre-test	159.05	152.35	146.21	20.48	0.00
	1st post-test	154.75	147.10	158.53		
	2nd post-test	150.55	142.35	152.84		
Left ankle flexion	Pre-test	90.65	84.60	104.74	0.174	0.95
	1st post-test	82.90	75.65	81.00		
	2nd post-test	77.40	73.20	76.79		
Left ankle extension	Pre-test	158.20	154.45	142.53	35.24	0.00
	1st post-test	153.75	150.85	156.58		
	2nd post-test	149.45	149.10	151.58		
Right knee flexion	Pre-test	141.55	133.15	133.58	38.03	0.00
	1st post-test	136.95	129.70	145.00		
	2nd post-test	133.00	124.60	138.79		
Right hip flexion	Pre-test	132.10	118.95	102.68	28.45	0.00
	1st post-test	127.50	113.95	122.05		
	2nd post-test	123.20	105.10	117.37		
Left knee flexion	Pre-test	141.40	130.25	131.79	34.17	0.00
	1st post-test	137.10	127.40	144.26		
	2nd post-test	132.85	124.40	138.26		
Left hip flexion	Pre-test	131.40	122.00	106.11	37.98	0.00
	1st post-test	127.35	117.60	124.89		
	2nd post-test	121.70	111.95	118.68		

This speaks to an important but often overlooked aspect of exercise programs in long-term care facilities (or any setting, for that matter); that participation in such program must be *ongoing* for the benefits to be enjoyed for any significant amount of time by participants.

Thirdly, this study benefited from the unique attribute of having a research setting where medical personnel were willing to provide a light-hearted but credible message to residents that the various programs were being 'prescribed' to them, in the same manner that medications or other medical treatments might be prescribed. This somewhat different approach may have been at least partly responsible for the number of various significant findings this research study was able to generate (Topp and Sabol Stevenson, 1994).

### 5.2. Limitations

From a methodological point of view, the research study could have been improved with the use of a randomized design, as opposed to having three separate units comprise the three various research groups. However, for primarily administrative reasons within the long-term care facility itself, a randomized design was not possible. While there was general consensus

among the medical and nursing staff that the residents on each of the three separate units were quite similar, the fact that there *were* some significant differences was borne out with the various differences in a variety of mean pre-test scores for each of the three groups/units. The researchers attempted to compensate for the lack of randomized design with the second control group (OT group) and the second data collection period (two post-test scores).

### 5.3. Implications

The main implication from this study is that both OT and exercise group programs appear to be associated with a number of cognitive, behavioral and physical improvements for long-term care residents. However, exercise programs appear to have the added benefit of improvements in the life satisfaction, balance, and lower body (ankle/knee/hip) flexibility of long-term care residents. Therefore, long-term care facilities should ideally commit themselves to offering regular exercise programming for their residents, to not only slow or prevent the decline in functional status typically associated with institutionalization, but also, as this research suggests, to actually *improve* the physical,

cognitive, behavioral and life satisfaction spheres of residents' lives.

The results of this research strongly support the need for exercise programs with an *ongoing* nature, to avoid the declines in physical and cognitive functioning that seem to accompany termination of such programs, in as little as 10 weeks. Therefore, there appear to be clear *ethical* implications for researchers and clinicians who are evaluating the outcomes of time-limited exercise programs. That is, while a substantial body of evidence has demonstrated the positive outcomes associated with exercise programs in long-term care facilities, the findings from this study would suggest that researchers and clinicians are in a sense doing harm when they stop these programs and/or reduce access to them; that the resulting decrease in function is *caused* by the cessation of such programs.

For example, our finding that life satisfaction drops significantly for participants after the cessation of an exercise program is quite sobering and begs the question: is it more humane and 'therapeutic' to offer a program which increases residents physical, cognitive and emotional well-being, and then withdraw the program—or is it better to not offer it at all? Is it better to raise someone's hopes, expectations and enjoyment of life in a long-term care facility, only to then take away those benefits—or is it better not to even improve that person's life to begin with? Obviously, the ideal solution is to offer such a program on an ongoing basis, but in circumstances where that is not possible, careful consideration needs to be given of the potentially negative consequences of only offering a time-limited program.

Finally, the authors believe that the wide-ranging positive benefits found to be associated with the musical exercise and/or occupational therapy programs may have at least been partly due to the way in which the research interventions were presented to residents. That is, by having the medical staff of the long-term care facility introduce the programs to residents in a compelling and enthusiastic way, a message was given to residents that their physicians not only *supported* the programs, but also saw them as important to their overall well being. Even though residents were allowed the complete freedom to decline participation in the therapy (and the study), the researchers were struck by the apparently positive influence that endorsement by the residents' physicians had on residents' decision to participate. This then raises the debate of whether or not exercise programs need to be elevated to the same status as occupational therapy and physiotherapy, which enjoy the 'status' of normally requiring a physicians' prescription—and therefore the explicit support that such a prescription carries.

Of course, such a debate in turn brings up yet another important debate in long-term care—the debate on how

'realistic' and 'feasible' exercise programs are in long-term care, given the very real pressures on staff time, resources and availability, and the rising levels of acuity and cognitive impairment of residents in long-term care. It is noteworthy, however, that this particular debate rarely, if ever, come up in relation to other kinds of 'traditional' therapeutic measures in long-term care, such as medications. So what is it about the aura of the intervention we know as 'medications'—that are always be given to long-term care residents, no matter how pressed and overworked the staff may be—compared to other research-based therapeutic interventions such as exercise that can be so easily dismissed as 'impractical' due to a perceived lack of resources?

The authors do not claim to have all the answers to such complex questions, but would like to at least suggest that the answer lies deeper than the supposed scientifically proven efficacy of interventions like medications, compared to other interventions. Indeed, reliable evidence exists to demonstrate that a multitude of interventions are effective when caring for older persons in long-term care, and how our society chooses to allocate resources in long-term care probably has as much to do with our perceptions and values, as it does with the available evidence.

In conclusion therefore, we believe it behooves nurses to not only examine the kinds of messages they are giving about the use of exercise in long-term care, but to work with other health professionals and administrators to re-examine the way that exercise is presented and promoted in long-term care facilities for older persons. Studies such as this one can help to provide the research-based support for using health promoting programs such as exercise in long-term care, but ultimately, nurses need to be involved in the larger political discussion of the values surrounding the care of older persons in long-term care. With such political advocacy, could it be that one day in the future, prescriptions for exercise programs in long-term care—with all their benefits and little or no side effects—actually outnumber the prescriptions for pharmaceuticals and other forms of therapy?

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# The advantages of occupational therapy in oral hygiene measures for institutionalised elderly adults

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## The advantages of occupational therapy in oral hygiene measures for institutionalised elderly adults

**Objective:** To investigate a new method in teaching and supervising tooth and denture brushing activities by employing occupational therapy techniques.

**Materials and methods:** Sixty-one residents, 44 women and 17 men, with an average age of  $85.7 \pm 6.6$  years (range 72–97 years) living in a Long-Term Care home (LTC) in Geneva were enrolled in a randomised controlled trial. They were divided at random into experimental (EG) and control groups (CG) with matched age and sex distribution. Two subjects passed away during the 3-month experimental period. Following medical history, plaque scores and tooth brushing habits were evaluated within the context of a comprehensive clinical assessment. Furthermore, a Mini Mental State and a vision test were taken. Based on the results of these health assessments both the EG and the CG were divided into an 'assisted' (IA) and an 'independent' (II) subgroup. In the EG, tooth brushing was initially taught and in the IA monitored and re-educated once a week by an occupational therapist. In contrast, the CG-IA group received a weekly placebo activity such as manicure by the same person.

**Results:** From the individual movements taught and monitored by the occupational therapist, opening a tube of toothpaste (n.s.) and denture brushing ( $p < 0.05$ ) were performed more independently after 3 months. Both the occupational therapy and the placebo activity led to a significant improvement in oral ( $p < 0.01$  and  $0.05$ ) and in denture hygiene ( $p < 0.001$  and  $0.05$ ). From all participants, the EG-IA subgroup presented the most significant amelioration in plaque ( $p < 0.01$ ) and denture hygiene scores ( $p < 0.001$ ). This group consisted mostly of subjects with an impaired cognitive state.

**Conclusions:** Despite the marked placebo effect, the results indicate that occupational therapy is particularly useful to improve the oral and denture hygiene in dependent and cognitively impaired LTC residents and may promote their autonomy in the execution of activities of daily life such as denture brushing.

**Keywords:** elderly, gerodontology, oral hygiene, occupational therapy, tooth and denture brushing, autonomy, Mini Mental State, dementia.

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## Introduction

Europe is facing a significant increase in the proportion of the population aged 60 years and over. Despite a slight stabilisation observed in the last decade, another increase is predicted from 19.2% to date to 29.5% in 2030. In 2000, 1.15 million people aged 60–79 years and 292 000 aged 80 or more lived in Switzerland<sup>1</sup>.

Prevention and progress in the restorative techniques have resulted in the ageing population

retaining more natural teeth and having removable dentures inserted later in life. Consequently, maintaining oral health will become an increasing preoccupation for the decades to come. Whereas with age the number of medical visits increases as the general health deteriorates, the number of dental appointments decreases despite an objective dental treatment need<sup>2,3</sup>. Dental services are used even less when subjects suffer from cognitive impairment such as dementia<sup>4</sup>.

Medical and dental research data have produced evidence that poor oral health is closely linked to the general health state, for example to systemic or infectious diseases such as pneumonia<sup>5-7</sup>. Oral health care also plays a role in preventing oral diseases, nutritional disorders and maintaining quality of life and self-esteem in elderly adults<sup>8-10</sup>. Oral health often loses priority when life is dominated by an impaired general health, reduced mobility and multimorbidity. With age, many persons neglect their oral hygiene measures due to diminished motivation, impaired cognition and/or reduced sight, sense of touch, vision or manual dexterity. Thus there are multiple reasons which result in an inadequate level of oral hygiene<sup>11-13</sup>.

Many traditional approaches have been employed to improve the oral hygiene in the institutionalised population comprising patient-oriented developments such as adequate cleaning tools<sup>14</sup>, recall and education programmes<sup>15,16</sup> and/or carer-oriented approaches such as lectures, questionnaires or guidelines<sup>17-19</sup>.

The aim of the present study was to incorporate an occupational therapist as a teacher of tooth and denture brushing activities into Long-Term Care (LTC) residents<sup>20</sup> and thus to promote for as long as possible their autonomy in the execution of the activities of daily life (ADL).

## Materials and methods

### Study participants

Sixty-one patients were included in the present study. There were 44 women and 17 men with an average age of  $85.7 \pm 6.32$  years and a median of 86 (range 72-97 years). This study received approval from the local research ethics committee. Based on the allocation to different buildings, the 61 patients were randomised into an experimental (EG) and a control group (CG) matched for age and gender. Two participants passed away during the experimental period and were excluded from analysis.

### Protocol

The study began with an educational lecture given to the medical and nursing staff of the LTC to raise their awareness to the dental hygiene needs of the residents and to motivate them to support the study from a logistic point of view.

Examinations and interventions were performed by a dentist (F.B.) and an occupational therapist

(N.J.). Each participant signed a consent form before entering the study confirming the right to drop out at any time without any stated reason. Subsequently, all participants underwent a Mini Mental State (MMS) assessment<sup>21</sup>. The maximum score was 30. The cognitive state was categorised as slightly (27-30), moderately (24-26) and severely impaired (0-23). All participants also underwent a standardised vision test<sup>a</sup>, where the task was to read texts of decreasing font<sup>a</sup>. Then an in-depth structured interview on their medical and dental history (modified after Von der Mühl<sup>22</sup>), oral hygiene habits, self-perception and well-being was taken. A comprehensive clinical examination was performed on all subjects including both a dental and a periodontal assessment. The hygiene level was assessed using a plaque score with a 0-3 scale based on the Plaque Index described by Silness and Loe<sup>23</sup> (0: no plaque; 1: plaque detectable by probe; 2: visible plaque; 3: abundant plaque). Denture plaque quantity was evaluated after the denture plaque index (CI) described by Ambjørnsen *et al.*<sup>24</sup>: each removable denture (partial or complete) was subdivided into five to seven distinct areas on the denture base. Again scores ranged from 0 to 3 (0: no plaque; 1: plaque visible by scraping with a blunt instrument; 2: moderate accumulation of visible plaque; 3: abundant plaque).

On the same day the participants took a test with the occupational therapist assessing the ability to perform the gestures required in tooth and denture brushing. The level of independence of each individual extra- and intra-oral gesture was scored on a scale from 0 to 3.5 which defined the level of autonomy required by each resident and his need of assistance.

Based on the results of the MMS, the questionnaire, the clinical examination and the brushing assessment, the EG and CG were divided into two subgroups: independent (II) and assisted (IA). At this point the protocol separated as follows:

*EG-II.* Initial occupational therapy instruction on tooth and denture brushing ( $n = 16$ ).

*EG-IA.* Initial occupational therapy instructions on tooth and denture brushing followed by weekly monitoring and if necessary re-education. The monitoring consisted of guidance and gesture education during the tooth and denture brushing ( $n = 13$ ).

*CG-II.* No intervention after the initial MMS, clinical examinations and questionnaire ( $n = 15$ ).

<sup>a</sup> Swiss National Association of and for the Blind (SNAB), Chemin des Trois-Rois 5b, CH-1005 Lausanne.

CG-IA. Weekly occupational therapy employing 'placebo' interventions like a manicure executed by the same occupational therapist (N.J.). This activity was analysed using the same criteria as for the tooth and denture brushing. Furthermore, she even promoted the dexterity in manicure ( $n = 15$ ).

The visits from the dentist and the occupational therapist were scheduled to fit in with the residents' daily routine and took place at the same time of the day whenever possible.

### Three-month re-evaluation

All participants were re-evaluated after an experimental period of 3 months and underwent a structured interview, a clinical examination as well as a brushing assessment.

### Statistical analysis

Statistical analysis was performed by means of StatView for Windows (SAS Institute, Cary, NC, USA). Normal distribution was not confirmed; therefore all differences between groups were tested for significance using the nonparametric Mann-Whitney *U*-test for unpaired data. Within-patient comparisons were performed with the nonparametric Wilcoxon sign test for paired data. Correlations were tested using the Spearman's rank correlation test.

## Results

Twenty-two of the participants were edentulous, 46 wore either complete or partial dentures. The number of residual teeth was  $7.2 \pm 8.6$ . With an average number of  $7.9 \pm 3.7$  drugs per day, 30 residents presented with a dry mouth, eight with xerostomia.

### MMS

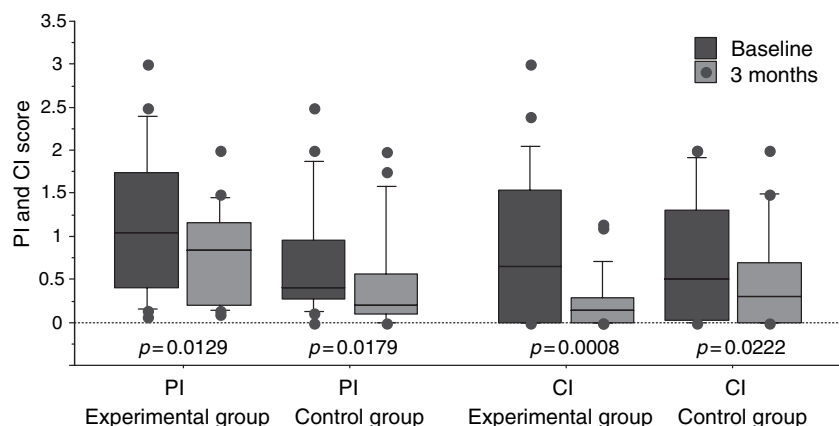
The results of the MMS test showed almost the same distribution in both groups, experimental and control. The cognitive state tended to deteriorate with age (n.s.).

### Brushing assessment

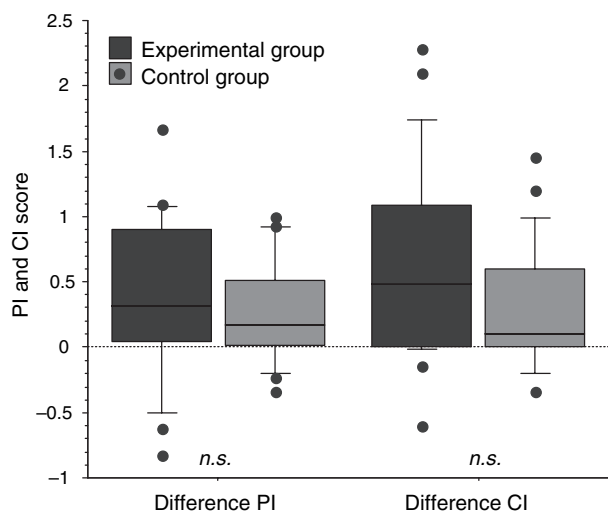
From the individual movements taught and monitored by the occupational therapist only denture brushing ( $p < 0.05$ ) was performed more independently after 3 months. There was also a trend for improvement in the individual's ability to open a tube of toothpaste, but this was not significant. Overall, extra-oral gestures seemed to have improved more than the intra-oral tooth brushing performance, but this trend was neither consistent nor significant. The superior and inferior anterior parts of the dentures were cleaned more effectively after occupational therapy intervention.

### Plaque scores (PI and CI)

Both the EG and the CG presented with a significantly improved oral and denture hygiene after the 3-month experimental period (Fig. 1). At baseline, the subgroup EG-IA presented with significantly higher plaque scores, both on the natural teeth ( $p < 0.001$ ) and the denture ( $p < 0.05$ ). PI tended to improve more in the lower than in the upper jaw (n.s.). As the initial plaque index was lower in the CG at baseline, the difference between the baseline and 3 months was calculated for each patient individually for further analysis. This difference in PI and CI presented the 'learning' effect associated with this intervention. There was a trend for this to be higher in the EG than the CG and seemed more pronounced for denture hygiene compared with



**Figure 1** Plaque index (PI;  $n = 34$ ) and denture plaque index (CI;  $n = 46$ ) at baseline and 3 months for experimental (EG;  $n = 29$ ) and control groups (CG;  $n = 30$ ).



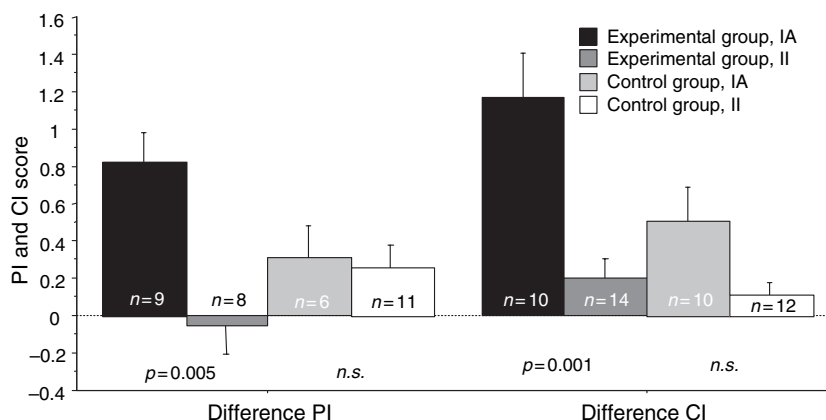
**Figure 2** Improvement in plaque index (PI) and denture plaque index (CI) over the experimental period of 3 months for experimental (PI  $n = 17$ , CI  $n = 24$ ) and control groups (PI  $n = 17$ , CI  $n = 22$ ).

oral hygiene (Fig. 2). Neither trend reached statistical significance.

*Occupational therapy assistance.* The IA groups received a weekly visit from the occupational therapist who performed either the denture and tooth brushing guidance (EG) or the manicure (CG) as placebo therapy. Both of the IA groups showed a learning effect superior to the II participants. These improvements were significantly greater for both PI ( $p < 0.05$ ) and CI ( $p < 0.001$ ) for the experimental groups. There was a similar trend for the CGs but this did not reach significance (Fig. 3).

*Mental state.* The IA EG showed the most significant reductions in both plaque ( $p < 0.01$ ) and denture hygiene scores ( $p < 0.001$ ). This group consisted mostly of subjects with an impaired cognitive state.

**Figure 3** Improvement in plaque index (PI) and denture plaque index (CI) in 3 months for dependent (IA) and independent study participants (II) in both experimental (EG) and control (CG) groups.



Those subjects who presented with a confirmed diagnosis of dementia (Alzheimer's disease, senile dementia) responded most to the occupational therapy intervention and showed marked improvements in both oral ( $p < 0.001$ ) and denture hygiene ( $p < 0.005$ ) (Fig. 4). Within the three groups of MMS scores, those participants with the lowest cognitive capacity (MMS 0–23) showed the highest improvements in both oral and denture hygiene (Fig. 5).

*Vision.* There were non-significant trends for extra-oral gestures to improve more in those subjects with an impaired vision, but for their PI and CI scores to be worse.

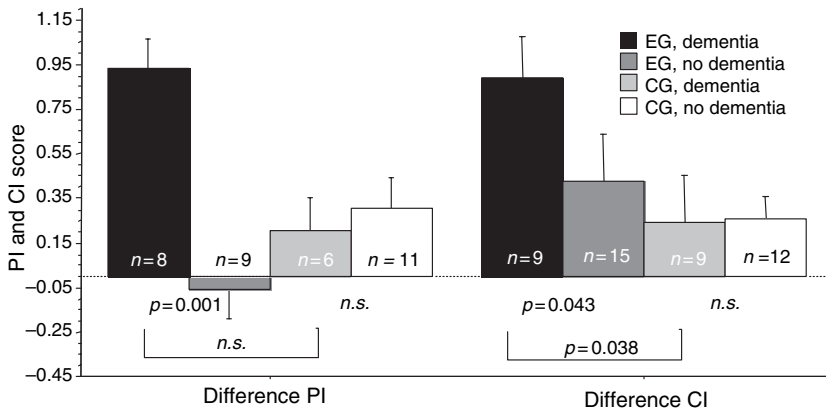
*Motor skills.* Subjects suffering from impaired motor skills such as arthrosis or hemiplegia following stroke showed no different PI improvements from those with 'normal' age-adequate motor skills. However, there was a trend for improved denture-cleaning skills (n.s.) (Fig. 6).

#### Tooth brushing habits

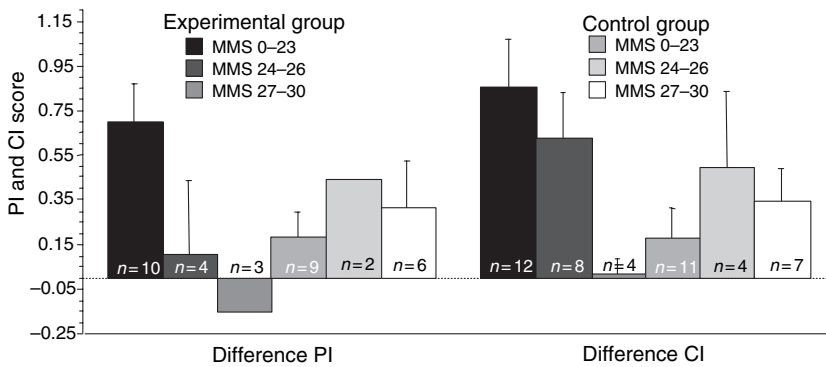
At baseline, 58 residents stated they used a manual toothbrush, one used an electrical brush and another one did not own a toothbrush. Of the denture wearers, 20 used a special denture brush and one used a cleaning tablet. After 3 months, 43 of the denture wearers used a denture brush. The resident without his own toothbrush refused to use the one he was given except for the brushing assessments. The frequency of brushing increased in some subjects (Fig. 7).

## Discussion

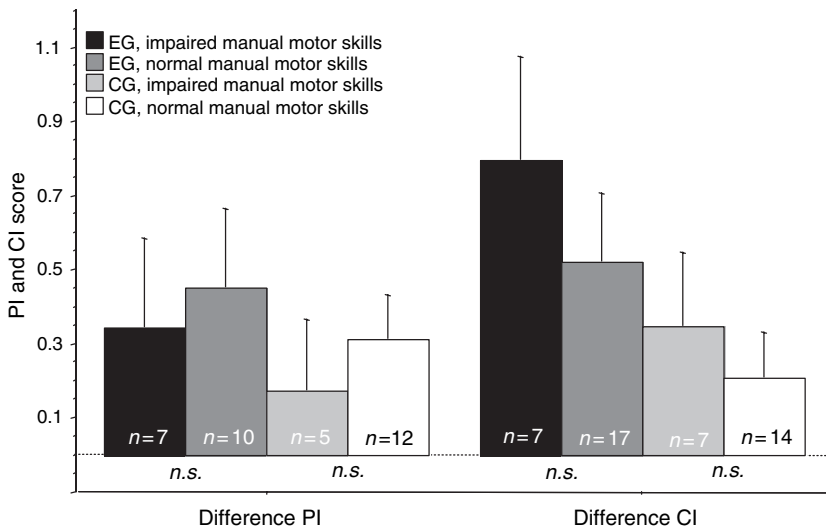
When interpreting the results of this study it has to be borne in mind that with an average age of 85.7 years, most study participants were suffering



**Figure 4** Improvement in plaque index (PI) and denture plaque index (CI) in 3 months for subjects with anamnestic dementia in both experimental (EG) and control (CG) groups.



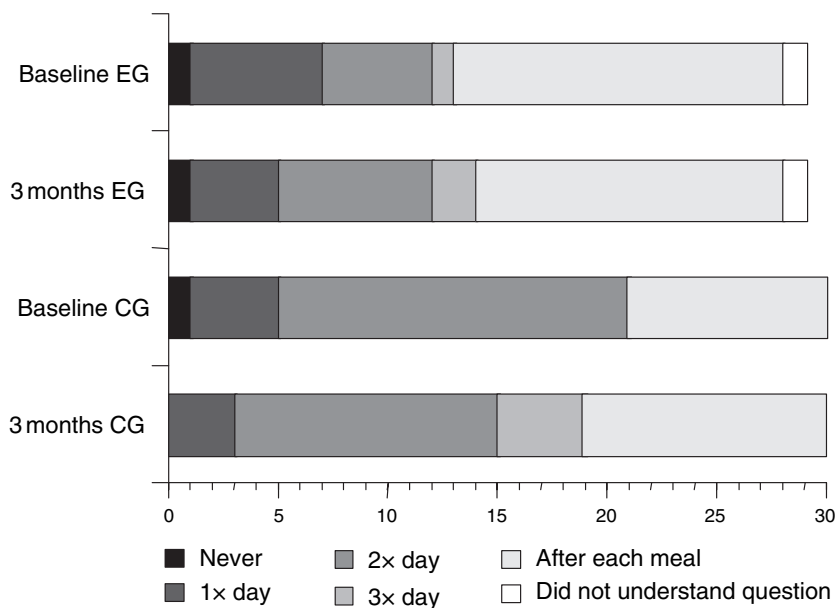
**Figure 5** Improvement in plaque index (PI) and denture plaque index (CI) in 3 months for different levels of Mini Mental State in both experimental (EG) and control (CG) groups.



**Figure 6** Improvement in plaque index (PI) and denture plaque index (CI) in 3 months for subjects with impaired manual motor skills in both experimental (EG) and control (CG) groups.

from a compromised general health and cognitive state. On the one hand, data were lacking in the structured interview because in some cases the resident did not understand the questions. On the other hand, it was the strength of the study to have included those patients as they achieved the greatest gain from occupational therapy intervention.

The well-known bias that patients tend to answer what they assume is expected seems less present in the demented cohort as answers were often strikingly honest. As in most clinical studies, the heterogeneity of the clinical variables and the number of subgroups may weaken the statistical significance of the conclusions that can be drawn from the experiments.



**Figure 7** Frequency of tooth brushing at baseline and the 3 months control in both experimental (EG) and control (CG) groups.

Occupational therapy intervention in tooth and denture brushing tended to particularly improve the gestures that involved a strategy of managing a given task. Thus denture cleaning proved to be most efficiently learned, even more in subjects with impaired vision. For example, in patients with hemiplegia, the occupational therapist introduced a more appropriate position in front of the sink and a special technique of seizing the denture with one hand. The greatest decrease in CI was seen in the anterior zones of the fitting surface of the denture. We attribute this to optimisation of the cleaning instruments and the systematic use of denture brushes. The ease of learning denture rather than tooth cleaning might be attributed to the less complex movement pattern that involves direct vision without a mirror.

Residents who retained some of their own teeth were generally in a better cognitive state (n.s.) and seemed therefore more resistant to advice. This might account for the disappointing lack of consistency in improvement of the intra-oral gestures.

Nevertheless a significant improvement in dental and denture plaque was observed after the 3-month trial period both in the EG and the CG indicating a significant placebo effect in the CG. In general, social contacts diminish in old age and solitude gets more and more prevalent as general health and mobility restrain the range of activities<sup>25</sup>. Moreover, cognitive impairment and depression diminish the patient's motivation for a social life. In this situation, the intervention of the occupational therapist might have been a welcome break in the daily monotony and routine. Although

experimental and control patients lived in two different buildings, they probably talked about the study over common meals that might explain why some CG participants knew the occupational therapist as 'Mrs Toothbrush'. Thus frequent reminding of 'teeth' and hygiene might have sufficiently raised the awareness and sensibility on the subjects. A further reason for the improved PI and CI could be that a placebo activity such as manicure has trained the manual dexterity of the participants. As shown in Fig. 1, the CG presented at baseline with a lower PI suggesting a higher level of performance at the outset.

In the EG, a statistically significant difference in PI and CI was found between the IA and II subgroups. Although at baseline the level of plaque was lower in the II group, the results clearly indicate that the learning effect was greater when a weekly visit took place for those people who needed assistance. These observations confirm previous results<sup>16</sup> showing effective improvements in oral hygiene with weekly visits over a period of at least 12 weeks. In addition, the newly acquired motor skills and their repeated re-education might also account for the improvements which were noted in the IA subgroup<sup>15</sup>. Learning new motor skills becomes more difficult in old age, as movement patterns are less prone to be modified with the age-related deterioration of central nervous system function. Repetition and time help in developing new movement patterns and motor skills.

Demented patients generally suffer more from oral diseases and show a lower level of oral

hygiene<sup>4,26,27</sup>. Therefore, their need for assistance in oral hygiene measures is increased. The approach of teaching oral hygiene measures through occupational therapy seems more adequate for patients with a low MMS and/or suffering from dementia as both their PI and CI improved significantly more than in the remainder EG or CG. The loss of cognition implies forgetting old habits and even life-long skills. Occupational therapy might help to reactivate former neuronal pathways. With impaired mental state words seem less efficient in acquiring motor skills than physical example and exercise. In contrast, an independent person in good mental health will often consider the occupational therapy approach as humiliating and belittling and thus refuse advice of this kind.

In both EG and CG, changing the habits was a very difficult goal to achieve; for example, one resident did not use a toothbrush at baseline and still refused after 3 months. A similar reluctance to changing habits has been observed in attempts to improve diet. With age, some residents perceive that their autonomy is diminishing<sup>25</sup> but they do not want to admit it. This may be the reason why they develop a resistance to what they consider an intrusion into their privacy. The oral field proved to be a very delicate matter, especially in the EG-II, and in some cases a significant effort was necessary to obtain collaboration. In contrast, the participants in the CG-IA more readily accepted the manicure because hand and nails represent a less intimate aspect than teeth, denture wearing or the oral cavity in general.

Despite the marked placebo effect, the results indicate that occupational therapy is particularly useful in improving the oral and denture hygiene in dependent and cognitively impaired LTC residents and may promote their autonomy in the execution of ADL such as denture brushing.

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## **Grupo de leitura e produção de textos: uma intervenção da terapia ocupacional**

### **Reading and text production group: an occupational therapy intervention**

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**RESUMO:** O *Grupo de Leitura e Produção de Textos* foi realizado com idosos que vivem em uma instituição de longa permanência. Os objetivos do grupo foram estimular as funções cognitivas, a criatividade e a iniciativa e promover a interação entre os idosos. Após 21 sessões foi possível observar que a atividade possibilitou a ampliação da rede de contato social dos participantes, aumentou a iniciativa e favoreceu a obtenção de satisfação pessoal. Os idosos apresentaram também ganhos qualitativos de funções cognitivas como a atenção e a memória explícita. Portanto, o grupo apresentou resultados terapêuticos positivos, ilustrando um processo sistematizado de prática terapêutica ocupacional com idosos que vivem em instituições de longa permanência.

**DESCRITORES:** Idoso. Institucionalização. Grupo. Leitura. Escrita. Terapia ocupacional.

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## INTRODUÇÃO

O avanço da idade aumenta a probabilidade de doenças e de prejuízos à funcionalidade física, psíquica e social. Mas, se os indivíduos envelhecerem com saúde, ativos, desempenhando papéis sociais, desfrutando de senso de significado pessoal e com autonomia e independência, poderão ter qualidade de vida na velhice (PASCHOAL, 2000).

Por outro lado, idosos que residem em instituições de longa permanência, e que se encontram inativos, têm seu potencial intelectual reduzido, e sua criatividade e relacionamento social afetados. A ausência de relações sociais priva o indivíduo de essenciais apoios emocionais e físicos (SÉ; LASCA, 2005).

Neste contexto, a intervenção terapêutica ocupacional visa manter, restaurar e melhorar a capacidade funcional, conservando o idoso ativo e independente o maior tempo possível (BARRETO; TIRADO, 2006). Destaca-se ainda a importância de manter a participação do idoso nas atividades cotidianas, preservando o senso de bem-estar e a qualidade de vida (TIRADO, 2004; BONDER, 2001).

A atenção em terapia ocupacional com o idoso em instituição de longa permanência pode ocorrer de formas distintas; individualmente ou em grupos. O presente estudo abordará o relato de um trabalho em grupo com idosos.

A intervenção com idosos, em grupos, adquire importância, no sentido de favorecer o bem-estar e estimular a reconstrução da identidade e, conseqüentemente, promover o resgate de capacidades e de vínculos sociais (ZIMERMAN, 1997; DEPS, 1999).

Os grupos podem fornecer oportunidades para partilhar experiências por meio de discussões e de desenvolvimento de programas de atividades, enfim, possibilitam manter e/ou estimular a atividade mental e a interação social. Portanto, devem ser incentivados nas instituições de longa permanência para idosos, uma vez que podem contribuir na prevenção do declínio cognitivo e na ampliação das redes de contato social (NEGREIROS, 2003; GUERREIRO, CALDAS, 2001).

O *Grupo de Leitura e Produção de Textos* aqui apresentado, foi realizado com idosos em uma instituição de longa permanência, durante o estágio curricular do curso de graduação em terapia ocupacional da Universidade Federal de Minas Gerais (UFMG). O grupo foi coordenado por uma estagiária e supervisionado pela professora da UFMG e pela terapeuta ocupacional da instituição. Participaram das discussões do trabalho outras duas acadêmicas e mais uma docente da UFMG.

Os objetivos do grupo foram: 1) estimular as funções

cognitivas (incluindo a atenção, a concentração e a memória), a criatividade, iniciativa e a orientação espaço-temporal; 2) promover a interação entre os idosos.

## MATERIALE MÉTODOS

O *Grupo de Leitura e Produção de Textos* foi realizado em uma instituição de longa permanência, com capacidade para 30 idosos de ambos os sexos e diagnósticos variados, no município de Belo Horizonte, MG, Brasil. No ano de 2006, de março a julho, foram realizadas 21 sessões, que ocorreram no período vespertino, duas vezes por semana – uma, na qual os textos eram produzidos, e a outra, para organização desses nos murais da instituição.

Participaram do grupo idosos com interesse pela leitura e escrita e que apresentavam comprometimentos cognitivos leves. As atividades do grupo foram desenvolvidas na sala de Terapia Ocupacional da instituição e este foi composto por nove idosos, sendo dois do sexo masculino, com idade entre 73 e 86 anos e com os seguintes diagnósticos: transtorno depressivo, transtorno cognitivo leve, sintomas psicológicos e comportamentais da demência (SPCD), e provável Demência de Alzheimer, na fase inicial. Cabe destacar que o número de participantes variou no decorrer dos encontros, com uma média de três participantes por sessão, já que a participação no grupo foi facultativa.

Os objetivos traçados inicialmente para o *Grupo de Leitura e Produção de Textos*, e as anotações descritivas das sessões, documentadas por meio de relatórios individuais que foram elaborados pela coordenadora e descreviam o desempenho dos participantes do grupo, foram utilizados como parâmetros para análise e discussão dos resultados.

## DINÂMICA DO GRUPO

### a) Abertura

Na abertura do grupo dois objetivos eram prioritariamente abordados: a promoção de interação entre os idosos e a orientação espaço-temporal. Os encontros iniciavam-se com a apresentação da coordenadora do grupo e de cada componente e posterior distribuição de crachás, com a finalidade de facilitar o reconhecimento e a interação entre os idosos. No primeiro encontro, foi firmado o contrato terapêutico, e informado aos participantes sobre os dias e os horários de atividades do grupo.

Em seguida, visando à orientação espaço-temporal, era realizada a Terapia de Orientação para Realidade (TOR), na qual se trabalhavam os aspectos temporais (dia, mês e ano) e espaciais (local de realização do grupo, nome da

instituição, cidade e Estado) com auxílio de pistas verbais e visuais por meio de um mural na parede (BOTTINO et al., 2002; KASHIMA et al., 1999).

#### **b) Leitura e discussão dos textos**

Após a apresentação, passava-se à leitura. Diferentes temas e formatos textuais foram trabalhados nos encontros. No decorrer das sessões, utilizaram-se contos, “pensamentos”, reportagens e textos temáticos sobre o processo de envelhecimento, relações humanas e festividades. Os textos eram fornecidos pela coordenadora; e os temas, escolhidos pelos idosos.

Antes do início da leitura, a coordenadora explicava aos participantes qual era a proposta do encontro, por exemplo, ler um texto e, mais tarde, dar a opinião a respeito dele ou dissertar sobre o tema em questão, ou escrever livremente sobre determinado tema. Essa estratégia era utilizada para que os idosos pudessem direcionar sua escuta durante a leitura, objetivando principalmente estimular a atenção, a memória e a concentração. Gomes e Boruchovitch (2005) enfatizam que os propósitos do leitor determinam as estratégias utilizadas para a compreensão.

Posteriormente, era realizada a leitura do texto, em alguns encontros pelos próprios participantes e em outros pela coordenadora, e, antes de dar início à produção, os integrantes discutiam sobre a interpretação desse texto.

A leitura envolve uma variedade de habilidades como por exemplo, identificação de letras, reconhecimento de palavras e integração de informações, além de processos de percepção, memória, inferência, dedução e processamento estratégico, portanto, é uma atividade cognitiva por excelência (FERREIRA, DIAS, 2002; KLEIMAN, 1995).

Entretanto, cabe destacar que a compreensão durante o processo de leitura depende de variáveis individuais, como personalidade, habilidades intelectuais, cultura e o contexto (SÉ & LASCA, 2005).

#### **c) Produção dos textos**

Após leitura e discussão dos temas, iniciava-se a produção dos textos. Nessa fase do grupo, os objetivos abordados foram a estimulação da criatividade e da iniciativa e a promoção da interação entre os participantes.

Nas primeiras sessões, os idosos demonstraram dificuldades para iniciar a redação dos seus textos. Visando solucionar tais dificuldades, uma estratégia empregada, no decorrer dos encontros, foi estimular a participação de todos durante a discussão e chamar a atenção para as opiniões diferentes que surgiam. Outra tática foi a graduação das atividades propostas. Inicialmente foram utilizados contos

mais curtos e, em seguida, contos mais longos.

A coordenadora fazia a leitura de parágrafos ou frases lentamente e repetia sempre que solicitado. Num momento posterior, os contos foram substituídos por reportagens e/ou textos temáticos, e finalmente foram utilizados “pensamentos” visando à estimulação da capacidade de abstração e à escrita mais livre dos idosos. Nos últimos encontros, esses passaram a escrever seus textos livremente, e as leituras iniciais foram interrompidas.

Durante o processo de produção, alguns participantes solicitavam o auxílio da coordenadora para o desenvolvimento ou a finalização de seus textos, o que era repassado aos outros integrantes do grupo. Para tanto, esses deveriam ler seu texto em voz alta para que os demais os auxiliassem em sua questão.

Ao longo das 21 sessões, os idosos elaboraram textos que trataram dos seguintes temas: Escrita (sua importância e utilização); Auto-aceitação (valorização das características pessoais); Natureza (preservação ambiental e manutenção dos recursos naturais); Festividade religiosa – Páscoa (seu significado e importância pessoal); Relações Humanas (convivência, interação, ajuda e respeito ao próximo); Envelhecimento (aspectos emocionais, físicos e sociais)

Nos últimos encontros, não foram fornecidos temas, a fim de possibilitar a autonomia e a escolha dos idosos.

Rance e Price (1973), referindo-se à escrita criativa, destacam que a resistência para expressão é frequentemente reduzida e as fantasias podem ser expressas, sem a exigência de aprovação ou receio de desaprovação.

Durante os encontros, foi possível observar que os textos foram se tornando mais detalhados e criativos, e que os participantes passaram a escolher os temas com maior iniciativa e interesse.

#### **d) Encerramento**

Após o término das produções, os participantes eram solicitados a ler seus textos em voz alta, e, em seguida, o grupo emitia, ou não, a opinião a respeito. Posteriormente, a coordenadora realizava o convite para o encontro seguinte, informando dia, horário e local, e estimulava os participantes a trazer textos de seu interesse para ser trabalhados. Finalizava-se com Orientação para a Realidade.

#### **e) Mostra dos Textos**

A coordenadora do grupo propôs aos participantes a realização de uma “mostra” dos trabalhos nos murais da instituição. Os textos foram editados em letras grandes juntamente com fotos recentes dos autores. A realização da mostra estimulou os participantes a investir em novas

produções, elevou a sua auto-estima, aumentou o seu sentimento de utilidade e a interação do grupo. Também funcionou como uma espécie de “convite informal” para os demais idosos da instituição, que, por meio da visualização do trabalho concreto daqueles participantes, foram incentivados a participar do grupo.

#### f) Construção do Álbum

Os dois últimos encontros do grupo foram dedicados à confecção do álbum do *Grupo de Leitura e Produção de Textos*, que continha as fotos dos idosos juntamente com os textos produzidos.

### DISCUSSÃO

Os encontros do *Grupo de Leitura e Produção de Textos*, na avaliação da coordenadora e na percepção dos idosos, contribuíram para promoção de mudanças em diversos desfechos clínicos, que foram definidos como objetivos terapêuticos para as sessões. Foi observada e percebida melhora na interação social entre os participantes, que passaram a conversar de forma mais espontânea e freqüente durante as sessões e também em outros horários. Observou-se ainda que os idosos apresentavam-se mais atentos e concentrados durante as sessões, com participação mais ativa nas atividades propostas, ilustrando possíveis mudanças na atenção, concentração, memória e na iniciativa. Ao final dos encontros, foi observada maior espontaneidade dos participantes diante das propostas apresentadas, em comparação com as primeiras sessões. Eles foram adquirindo, durante os encontros, maior autonomia e independência na leitura, interpretação, elaboração e redação de textos, solicitando cada vez menos o auxílio da coordenadora, sobretudo nas últimas sessões, nas quais não foi necessário fornecer nenhum auxílio.

Ao longo do processo, os idosos foram estimulados a exercitar a criatividade e passaram a escrever de forma mais livre, criativa e poética. Observou-se ainda maior expressão de sentimentos, uma vez que eles compartilharam fatos

significativos e experiências de vida. Os participantes foram também estimulados a desenvolver estratégias para a realização das atividades propostas e mostraram maior compromisso com o grupo e preocupação com o resultado dos textos.

Observou-se que a realização da mostra foi considerada um marco importante no processo terapêutico do grupo. Segundo relatos dos participantes, por meio dela foi possível expor o trabalho realizado a toda a instituição. Salienta-se que funcionários, familiares, visitantes e os outros idosos elogiaram os autores pelo trabalho realizado, e alguns até solicitaram cópias dos textos expostos. Esse reconhecimento possibilitou a satisfação pessoal deles, o aumento da auto-estima e do sentimento de utilidade.

Finalmente, ressalta-se que a confecção do álbum foi fundamental para o fechamento das atividades realizadas no grupo. A compilação de todo o trabalho produzido com fotos dos autores ao lado de suas produções possibilitou a visualização do percurso realizado ao longo das 21 sessões.

Após a apreciação do álbum finalizado, a coordenadora realizou o encerramento do grupo. Eis o depoimento de uma participante: “Você abriu uma porta, e uma porta bem aberta!” (sic).

### CONSIDERAÇÕES FINAIS

O *Grupo de Leitura e Produção de Textos* constitui um relato de experiência no atendimento a idosos institucionalizados, e possibilitou a interação dos participantes, contribuindo para a promoção de funções cognitivas, da criatividade e da iniciativa, bem como para o crescimento pessoal e contrabalançando as perdas comuns a esse estágio da vida. Portanto, o grupo apresentou resultados terapêuticos positivos, ilustrando um processo sistematizado de prática terapêutica ocupacional com idosos que vivem em instituições de longa permanência.

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NASCIMENTO, V. P.; LINO, M. E. S.; CAMPOS, G. V.; ANDRADE, E.; MANCINI, M. C.; TIRADO, M. G. A. Reading and text production group: an occupational therapy intervention. **Rev. Ter. Ocup. Univ. São Paulo**, v. 18, n. 1, p. 17-21, jan./abr., 2007.

**ABSTRACT:** Group activity focusing on reading and text production was conducted with elderly living in a long stay institution. The group objectives were to stimulate cognitive functions, creativity and initiative, besides promoting the interaction among the elderly. After 21 sessions, it was possible to observe that the activities allowed a broadening of the participants' social interaction network, improved the initiative and favored the attainment of personal satisfaction. The elderly also showed qualitative gains in cognitive functions such as attention and explicit memory. In conclusion, the group showed positive therapeutic outcomes, illustrating a systematic occupational therapy process with elderly who live in long stay institutions.

**KEY WORDS:** Elderly. Institutionalization. Group. Reading. Writing. Occupational therapy.

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## **A controlled clinical trial on the effects of motor intervention on balance and cognition in institutionalized elderly patients with dementia**

Gustavo Christofolletti, Merlyn Mércia Oliani, Sebastião Gobbi, Florindo Stella, Lilian Teresa Bucken Gobbi and Paulo Renato Canineu

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# A controlled clinical trial on the effects of motor intervention on balance and cognition in institutionalized elderly patients with dementia

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**Purpose:** To analyse the effects of two interventions on the cognition and balance of institutionalized elderly people with mixed dementia.

**Methods:** Fifty-four participants were allocated into three groups. Group 1 was assisted by an interdisciplinary programme comprising physiotherapy, occupational therapy and physical education. A physiotherapist alone carried out the intervention in group 2. Group 3 was considered as control. Assessors were blinded to guarantee the absence of bias. Cognitive functions were analysed with the Mini-Mental State Examination and the Brief Cognitive Screening Battery. Balance was assessed with the Berg Balance Scale and the Timed Get-Up-and-Go Test. Multiple analysis of variance (MANOVA) was used to test possible main effects of the interventions.

**Results:** The results showed benefits on the balance of subjects in both groups 1 ( $F=3.9$ ,  $P<0.05$ ) and 2 ( $F=3.1$ ,  $P<0.05$ ), compared with group 3. MANOVA did not indicate benefits on the cognitive functions between groups 1 and 3 ( $F=1.1$ ,  $P>0.05$ ) and groups 2 and 3 ( $F=1.6$ ,  $P>0.05$ ). However, univariate analysis indicated some benefits of the interdisciplinary intervention on two specific domains measured by the Brief Cognitive Screening Battery ( $F=26.5$ ,  $P<0.05$ ;  $F=4.4$ ,  $P<0.05$ ).

**Conclusion:** Six months of multidisciplinary or physiotherapeutic intervention were able to improve a person's balance. Although global cognition did not improve through treatment, when the intervention was carried out on a multidisciplinary basis we observed an attenuation in the decline of global cognition on two specific cognitive domains. Exercises applied in different contexts may have positive outcomes for people with dementia.

## Introduction

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Dementia is a syndrome resulting from disease of the brain, usually of a chronic or progressive nature, in which there is disturbance of multiple higher cortical functions, including memory,

thinking, orientation, comprehension, calculation, learning capacity, language, recognition and judgement, as well as behaviour and daily living activities.<sup>1,2</sup> Elderly people with dementia plus disturbed balance are frequently institutionalized.<sup>3</sup> Such patients exhibit a decline in some cognitive functions as well as an impaired static balance, a slow gait speed and a short stride length.<sup>4,5</sup> Numerous studies have been carried out to investigate pharmacological and non-pharmacological interventions for this syndrome.

Among non-pharmacological strategies, interventions involving physiotherapy (kinesiotherapeutic sessions), occupational therapy (exercises on daily living activities) and physical education (functional capacities trainings) have been proven to be important tools in the promotion of health and quality of life.<sup>6,7</sup> Studies have confirmed the usefulness of motor interventions for improving variables such as depression, memory, speech, behaviour, social relationship and physical health.<sup>8</sup>

In residential care settings, exercise interventions have been shown to have positive outcomes for people with or without cognitive impairments.<sup>9,10</sup> Nevertheless, there is still a lack of studies and much controversy regarding this subject. For Christofolletti *et al.*,<sup>8</sup> some variables such as type and intensity of intervention, as well as severity of dementia and statistical analysis adopted, may cause difficulties in analysing the factors related to the patient's improvement.

The aim of this study was to analyse the effects of two motor interventions on the cognitive functions and on the balance of institutionalized elderly people with mixed dementia. The hypothesis expected is that both interventions may cause positive outcomes for people with dementia. We believe that these treatments improve the subject's balance by the effects of motor training *per se* and attenuate the decline of several executive functions, such as attention and planning abilities, by stimulating social interactions at the sessions.

## Methods

### Participants

A six-month longitudinal design was used to analyse the effects of two interventions on 54

institutionalized elderly people with mixed dementia. The sample consisted of moderate stage subjects, aged  $74.3 \pm 1.4$  years at entry, with  $4.8 \pm 0.7$  years of education. A research physiotherapist identified the elderly people that fulfilled the following study criteria: (a) a primary diagnosis of dementia, based on ICD-10<sup>11</sup> Classification of Mental and Behavioral Disorders, and confirmed by the patient's performance on the Mini-Mental State Examination<sup>12</sup> and on Katz Activities Daily Living Scale<sup>13</sup>; (b) no other neurological diagnosis or neuropsychiatric conditions associated to cognitive impairment; (c) medically fit in order to participate in therapy; (d) no prescriptions of antidepressant medications with central anticholinergic or sedation actions; (e) no drug-related impairment of cognition or balance, and (f) residing in a long-term psychiatric institution.

### Procedures

Patients who met the inclusion criteria were allocated to one of three groups. A sealed envelope with an identification number was assigned to each subject, each one filled with a slip giving the group. When a patient was registered and given a number, the appropriate envelope was opened. As a common bias presented on most rehabilitation trials, it was not possible to 'blind' the subjects regarding the treatments. However, assessors were 'masked' with respect to the data collected and to those patients that were included or not in this trial.

Group 1 was assisted by an interdisciplinary programme that consisted of physiotherapy, occupational therapy and physical education. The intervention occurred five times a week, 2 hours per day. The physiotherapeutic sessions were individual and concentrated on specific kinesiotherapeutic exercises that stimulated strength, balance and cognition such as concentrated attention, recognition, immediate memory, working memory and praxis. For that, bars, Bobath balls, elastic ribbons and proprioceptive stimulation plates were used. The occupational therapist carried out activities in-group, by means of arts and crafts activities (pictures, paintings, drawings and embroidering) that associated motor coordination exercises with cognition.



The intervention of the physical education professional was carried out in-group, developing the components of functional capacities. For that, walking sessions were done and commonly associated to upper and lower limbs exercises to stimulate strength, balance, motor coordination, agility, flexibility and aerobic endurance.

The intervention with group 2 was carried out by the physiotherapist. The sessions occurred three times a week, 1 hour per day. The same kinesiotherapeutic exercises used as with group 1. Group 3 was considered a control group, with no motor intervention. Medication was kept unchanged in the three groups. If a resident had a change in health status that required a change in medication, he or she was dropped out of the study.

Outcome measures were made at baseline and repeated after six months. Cognitive functions were analysed with the Mini-Mental State Examination and the Brief Cognitive Screening Battery. To analyse the patients' balance, the Berg Balance Scale and the Timed Get-Up-and-Go test were applied.

The Mini-Mental State Examination<sup>12</sup> is composed of questions grouped into seven categories, each one designed to evaluate specific cognitive functions: time orientation, place orientation, three-word register, attention and calculation, immediate and delayed recall of the three words, language, and visuoconstructive praxis. The scores vary from 0 to 30 points, and lower values represent a possible cognitive decline. Because the test is influenced by educational level, the cut-off point of scores between 'case' and 'non-case' need to be adjusted according to this influence. Analysing a Brazilian sample, Brucki *et al.*<sup>14</sup> proposed different average scores related to distinct educational levels: for illiterate subjects, 20 points; 1–4 years of education, 25; 5–8 years, 26.5; 9–11 years, 28; and for individuals with education over 11 years, 29 points.

The Brief Cognitive Screening Battery<sup>15,16</sup> is an ease achievement instrument for evaluating cognitive functions in elderly people that consists of the presentation of a sheet of paper with 10 common figures (shoe, spoon, hair-comb, tree, turtle, key, airplane, house, book and bucket). Each one of the objects should be identified and named by the individual (identification/

nomination), and then immediately recalled without prior information that the objects should be memorized (incidental memory). After that, the figures are presented to the individuals, who are asked to memorize and recall them (immediate memory). The figures are then presented again, in order to be memorized, and evoked (learning memory). The figures are presented one more time to the subjects for memorizing (delayed memory), but where should evoke them later on, after subsequent interference with the Semantic Verbal Fluency Test (animals/minute)<sup>17</sup> and the Clock Drawing Test.<sup>18</sup> Finally, the 10 figures are shown together with 10 distractors, and the individual should recognize the figures initially presented (recognition).

The 14-item Berg Balance Scale identifies and evaluates balance impairment in older adults.<sup>19</sup> The items involve balance that is common to many functional tasks, such as reaching, bending, transferring, standing and rising. The items are graded on a five-point ordinal scale ranging from 0 to 4, yielding a total of 56 points. The test is simple, easy to administer and safe for the assessment of elderly patients. It only requires a watch and a ruler as equipment and it takes approximately 15 minutes to perform. In this test, lower values indicate a higher risk of falls.

The Timed Get-Up-and-Go test<sup>20,21</sup> is a modified, timed version of the 'Get Up and Go' test.<sup>22</sup> It measures the time and the number of steps that it takes a person to rise and stand from a standard armchair, walk a distance of 3 m, turn, walk back to the chair, and sit down. A longer time, or higher number of steps to complete the task indicated an increased risk of falls.

### Statistical analysis

The groups' sociodemographic characteristics were calculated by means of the analysis of variance test (ANOVA one-way). Scheffé post-hoc tests were utilized in those cases with differences at baseline.

Multiple analysis of variance (MANOVA two-way) were used to verify the main and interaction effects on the patients' cognitive functions and balance, with respect to group 1 versus group 3, and group 2 versus group 3. Covariate factors

were utilized in those cases with baseline differences. Further testing on the dependent variables was carried out using the ANOVA two-way test, with a 5% significance level.

A pilot study was undertaken to establish the appropriateness of assessment tools and the standardization of procedures. Ethical approval was obtained from the ethics committee of the UNESP–Sao Paulo State University (Biosciences Institute, Rio Claro, SP, Brazil). Before the study admission, the patient's next-of-kin (usually the main informal carer) was approached for informed consent.

## Results

The sample of 54 elderly people was divided into three groups. Table 1 shows the sociodemographic and clinical characteristics of the participants.

There were no differences between the groups regarding sex distribution and period of institutionalization. ANOVA one-way pointed baseline differences with respect to age ( $F=6.2$ ,  $P<0.05$ ) and educational level. Scheffé post-hoc test indicated differences between groups 1 and 3 for age ( $P<0.05$ ) and educational level ( $P<0.05$ ). This test also indicated differences between groups 2 and 3, but only regarding age ( $P<0.05$ ).

With respect to medication, 20 participants were using antihypertensive (adrenergic receptor antagonists and/or diuretics) medications; 13, non-benzodiazepine anxiolytics; 8, atypical antipsychotics; 8, analgesics (non-steroidal

anti-inflammatory); and 5, anticonvulsants. Vitamin supplements, as well as hypolipidaemic drugs, were prescribed to most participants. There were no group differences with respect to this variable. The medications were unchanged during the trial.

### Comparison between groups 1 and 3

Analysing the effects of the interdisciplinary programme on the cognitive functions of institutionalized elderly people with dementia, MANOVA pointed to a main effect of time ( $F=9.0$ ,  $P<0.05$ ; effect size=0.94), indicating cognitive decline in both groups after six months. No statistically significant main effect was observed for group ( $F=1.4$ ,  $P>0.05$ ) and for group  $\times$  time interaction ( $F=1.1$ ,  $P>0.05$ ). However, further testing with ANOVA showed statistically significant main effects for group  $\times$  time interaction with respect to Verbal Fluency Test ( $F=26.5$ ,  $P<0.05$ ) and Clock Drawing Test ( $F=4.4$ ,  $P<0.05$ ), indicating that the interdisciplinary intervention could attenuate some of the decline in specific cognitive domains.

Regarding balance, MANOVA indicated the main effect of group  $\times$  time interaction ( $F=3.9$ ,  $P<0.05$ ; effect size=0.76), and not for group ( $F=2.3$ ,  $P>0.05$ ) or time ( $F=1.4$ ,  $P>0.05$ ). ANOVA revealed a difference only with respect to Berg Balance Scale  $F=10.3$ ,  $P<0.05$ ). Mean and standard deviation about the effects of motor treatment between groups 1 and 3 are shown in Table 2.

**Table 1** Clinical and sociodemographic characteristics of the participants (means and standard deviation)

	Group 1	Group 2	Group 3
Gender (male/female)	6/11	5/12	6/14
Age <sup>a</sup>	70.0 $\pm$ 1.8	72.9 $\pm$ 2.3	79.4 $\pm$ 2.0
Level of education (years) <sup>a,b</sup>	9.0 $\pm$ 1.4	4.7 $\pm$ 1.2	2.0 $\pm$ 0.5
Period of institutionalization (years)	5.9 $\pm$ 1.2	4.8 $\pm$ 1.0	6.1 $\pm$ 1.5
MMSE (points)	18.7 $\pm$ 1.7	12.7 $\pm$ 2.1	14.6 $\pm$ 1.2
KADLS (points)	5.0 $\pm$ 0.3	4.6 $\pm$ 0.5	4.5 $\pm$ 0.5

MMSE, Mini-Mental State Examination; KADLS, Katz Activities Daily Living Scale.

<sup>a</sup>Significant difference between groups 1 and 3.

<sup>b</sup>Significant difference between groups 2 and 3.

### Comparison between groups 2 and 3

Analysing the effects of the physiotherapeutic intervention on the cognitive functions of institutionalized elderly people with dementia, MANOVA pointed to a main effect of time ( $F=3.6$ ,  $P<0.05$ ; effect size=0.92), indicating cognitive decline in both groups after six months. No statistically significant main effect was observed for group ( $F=1.7$ ,  $P>0.05$ ) and for group  $\times$  time interaction ( $F=1.6$ ,  $P>0.05$ ). Univariate analysis showed no statistically significant group  $\times$  time interaction with respect to the Mini-Mental State Examination and the Brief Cognitive Screening Battery.

As seen in the first comparison, MANOVA indicated main effect of group  $\times$  time interaction ( $F=3.1$ ,  $P<0.05$ ; effect size=0.64), and not for

group ( $F=0.9$ ;  $P>0.05$ ) or time ( $F=3.0$ ,  $P>0.05$ ), relating to the subjects' balance. Univariate analysis revealed statistically significant group  $\times$  time interaction for the Berg Balance Scale ( $F=7.9$ ,  $P<0.05$ ). Mean and standard deviation about the effects of physiotherapeutic treatment between groups 2 and 3 are shown in Table 2.

Figure 1 shows a flow diagram regarding the drop-out rate. Thirteen of the original 54 patients in the study were unable to complete the trial. The drop-out rate was higher in the treatment groups (5 subjects in groups 1 and 2) than in the control group (3 subjects). The reasons for their exclusion were: 4 subjects developed clinical instability; 3 were disqualified after receiving tricyclic antidepressants; 3 withdrew for unknown reasons; and

**Table 2** Outcome data at baseline and at six months: means and standard deviations regarding cognitive and balance tests

	Group 1	Group 2	Group 3
<b>At baseline</b>			
MMSE (points)	18.7 $\pm$ 1.7	12.7 $\pm$ 2.1	14.6 $\pm$ 1.2
BCSB tests (points):			
Identification/nomination	9.7 $\pm$ 0.2	7.7 $\pm$ 1.0	9.5 $\pm$ 0.3
Incidental memory	3.7 $\pm$ 0.6	2.7 $\pm$ 0.7	3.3 $\pm$ 0.5
Immediate memory	4.2 $\pm$ 0.7	3.7 $\pm$ 0.8	4.1 $\pm$ 0.5
Learning memory	4.5 $\pm$ 0.8	2.8 $\pm$ 0.7	4.7 $\pm$ 0.5
Delayed memory	3.6 $\pm$ 0.7	2.2 $\pm$ 0.9	3.2 $\pm$ 0.4
Clock Drawing Test	3.5 $\pm$ 1.0	3.0 $\pm$ 0.8	3.4 $\pm$ 0.6
Verbal Fluency Test	7.8 $\pm$ 1.3	5.8 $\pm$ 1.7	9.2 $\pm$ 0.9
Recognition	5.8 $\pm$ 1.1	5.0 $\pm$ 1.0	5.9 $\pm$ 0.8
Berg Balance Scale (points)	39.5 $\pm$ 1.9	37.4 $\pm$ 2.0	35.2 $\pm$ 2.6
Timed Get-Up-and-Go (steps)	19.9 $\pm$ 1.4	28.2 $\pm$ 3.6	31.3 $\pm$ 4.2
Timed Get-Up-and-Go (seconds)	13.7 $\pm$ 1.2	22.3 $\pm$ 4.4	30.6 $\pm$ 6.5
<b>At six months</b>			
MMSE (points)	20.2 $\pm$ 1.6	14.9 $\pm$ 2.2	14.8 $\pm$ 1.3
BCSB tests (points):			
Identification/nomination	9.2 $\pm$ 0.5	8.6 $\pm$ 0.9	8.4 $\pm$ 0.6
Incidental memory	3.3 $\pm$ 0.7	3.5 $\pm$ 0.8	3.4 $\pm$ 0.7
Immediate memory	4.7 $\pm$ 0.6	3.6 $\pm$ 0.8	4.5 $\pm$ 0.6
Learning memory	5.3 $\pm$ 0.7	3.9 $\pm$ 0.7	4.5 $\pm$ 0.6
Delayed memory	4.2 $\pm$ 0.8	3.2 $\pm$ 0.8	3.3 $\pm$ 0.7
Clock Drawing Test	4.1 $\pm$ 1.1	3.1 $\pm$ 0.8	2.9 $\pm$ 0.6
Verbal Fluency Test	7.9 $\pm$ 1.5	5.4 $\pm$ 1.2	6.4 $\pm$ 1.1
Recognition	7.0 $\pm$ 1.0	4.7 $\pm$ 1.3	4.8 $\pm$ 0.9
Berg Balance Scale (points)	41.7 $\pm$ 2.4	37.7 $\pm$ 2.8	27.4 $\pm$ 3.2
Timed Get-Up-and-Go (steps)	18.3 $\pm$ 1.2	25.5 $\pm$ 3.6	35.3 $\pm$ 6.4
Timed Get-Up-and-Go (seconds)	12.9 $\pm$ 1.0	22.1 $\pm$ 4.0	35.6 $\pm$ 8.6

MMSE, Mini-Mental State Examination; BCSB, Brief Cognitive Screening Battery.

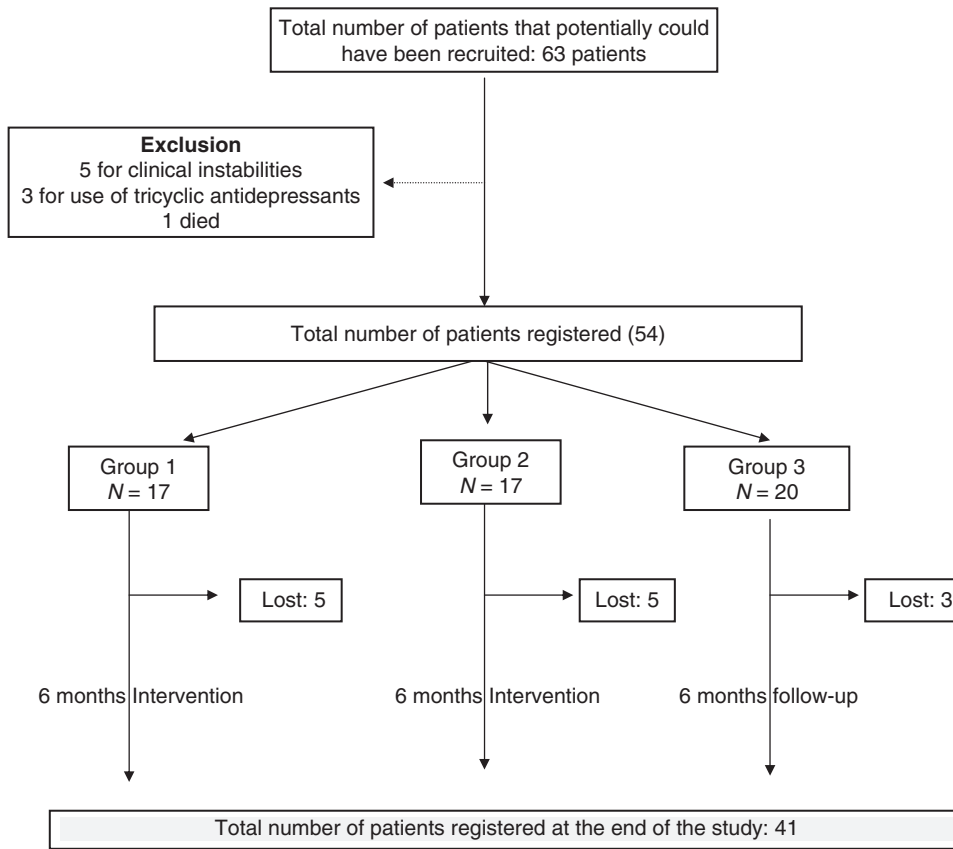


Figure 1 Flow diagram showing drop-out rate.

3 died during the study. No patients were excluded due to lack of compliance with or intolerance to either treatment regimen.

### Discussion

The results showed beneficial effects of the intervention on the balance of institutionalized elderly people with dementia. A discrete and probably fortuitous attenuation of decline in some cognitive domains was observed only in group 1.

Balance is an important component of functional capacity and is necessary for static, dynamic and recovered stability of the body.<sup>23</sup> The findings

for groups 1 and 2 agree with findings reported in the literature and emphasize the benefits of physiotherapy, occupational therapy and physical education as essential interventions for the maintenance of balance and preventing falls in elderly with dementia.<sup>24</sup>

Nevertheless, it should be noted that the intrinsic factors involved in falls are closely related to the sensorimotor alterations inherent in the ageing process (visual alterations, paraesthesias, weakness, decreased flexibility and mobility), whereas the extrinsic factors associated with difficulties found in the environment (such as holes, stairs and uneven terrain) demand cognitive activation of a more complex order (such as concentrated attention, gnosia and executive functions) which

are strongly affected by dementia.<sup>25,26</sup> Thus a multidisciplinary intervention, unlike physiotherapy alone, was positive in that it improved intrinsic as well as extrinsic factors affected in elderly people with dementia.

Cognitive functions are complex and are difficult variables to quantify. This obstacle can be attributed to two main factors: limited knowledge regarding the cortical and subcortical pathways related to cognitive functions; and the biases of the instruments with respect to semi-literate populations.<sup>27</sup> In other words, most instruments require a minimum of comprehension and schooling to enable evaluation of cognitive functions. For the Clock Drawing Test, for example, the individual must have previous knowledge regarding order and numerical sequencing. Low scores for semi-literate individuals may represent cognitive decline or lack of comprehension about how to draw a clock.

Like the Clock Drawing Test, the Mini-Mental State Examination suffers from the influence of educational level.<sup>14</sup> The method used to minimize this influence involves standardization of 'cut-off scores' according to the subject's years of schooling. The Brief Cognitive Screening Battery is influenced little by educational level as it requires no reading or writing skills.<sup>15,16,27</sup>

Despite the potential limitations of these instruments, it is worth noting that they are recognized internationally and have shown adequate sensitivity, validity and reliability. Consequently, we opted to use the Clock Drawing Test and the Mini-Mental State Examination, together with the Brief Cognitive Screening Battery and the Verbal Semantic Fluency Test, because we believe that the influence of educational level on the results are attenuated through the multiple and paired analysis of the data.

There is no consensus in the literature with respect to the effects of a motor intervention on the cognitive functions of elderly with dementia.<sup>8</sup> While some authors admit that such an intervention has no influence on cognitive functions, others disagree, alleging that the great difficulty in proving such benefits are due to: (1) the small number of studies on the topic; (2) difficulties related to controlling some methodological and sampling biases; and (3) short follow-up periods.

The lack of consensus related to the type of activity complicates analysis of the benefits of the motor intervention.<sup>28</sup> In the present study, groups 1 and 2 were similar with respect to the interventions, which were characterized, above all, by specific kinesiotherapeutic exercises associated with cognitive stimulation.

Considering that groups 1 and 2 are similar and were subject to interventions with the same objective but differing with respect to the number of professionals and activities, we could infer a particular aspect. It was verified that there was an attenuation in the decline in some cognitive domains in group 1 compared with group 3, especially in the Clock Drawing Test and Semantic Verbal Fluency Test. This attenuation could have been potentiated by the association of the motor intervention with the widening of social networks that resulted from the intervention in group 1. However, the same result was not observed in the comparison of groups 2 and 3.

Both the Clock Drawing Test and the Semantic Verbal Fluency Test require significant activation of executive functions.<sup>29</sup> The more positive results obtained in group 1 compared with group 3 suggest that the interdisciplinary motor intervention could be promoting activation of the frontostriatal-pallidus-thalamus-cortical pathways, and stimulating executive abilities in the elderly. Clearly this is only a supposition, as we did not use positron emission tomography scanning.

When the institutionalized population is analysed, the sample generally includes very old people in moderate or advanced stages of dementia. As a consequence, the presence of depression is quite common, making cognitive analysis *per se* even more difficult, due to its influence on cognitive function in the elderly.<sup>29</sup> In addition, the motor intervention causes immediate effects on depressive symptoms, making it difficult to determine if the benefits of the motor intervention for the elderly individual with dementia were related to cognitive functions or to attenuation of depressive symptoms.<sup>30</sup> As a result, the researcher who evaluates this population is faced with a dilemma: whether or not to exclude depressed individuals from the sample. If excluded, the sample size will be considerably reduced because of the high rate of depressive symptoms in this population; if not excluded, the sample will become contaminated,

making it difficult to prove whether the benefits of the intervention are a result of cognitive maintenance or of attenuation of depressive symptoms, which are strongly related to the former. In this study, we opted to exclude elderly patients with depressive symptoms and minimize the sampling and methodological biases as much as possible.

The medications administered to elderly people should also be analysed with caution, as they can influence both cognitive functions and balance.<sup>31</sup> In the present study there was a very similar distribution of medications among the groups, and with no changes in medication and dosage after six months of analysis. This fact is extremely important as it indicates that this confounding variable had little or no influence on the results.

Although several biases have been controlled by the trial, we admit that not all items established by the consort statement<sup>32</sup> were contemplated. Some weaknesses, such as the relatively small sample size (that makes it difficult to achieve an effect size higher than 80%), the risks associated with looking at subgroups and the drop-out rate are quite common in several published papers.<sup>8</sup> The limitation involving the small sample size is partially explained by the small number of beds for long-term residents with dementia in psychiatric institutions in Brazil. Others difficulties include the diagnosis of specific kinds of dementia in these institutions and the high prevalence of depressed symptoms overlapping cognitive impairments.

With respect to the drop-out rate, the results showed a higher frequency of drop-out in the treatment groups than in the control group. Although the reasons given for withdrawal were unrelated to the treatment, we admit that the differential drop-out rate could affect the interpretation of our results.

In conclusion, six months of multidisciplinary or physiotherapeutic intervention improved the balance of institutionalized elderly people with dementia. Although global cognition did not improve when the intervention is carried out on a multidisciplinary basis, we observed an attenuation of its decline, particularly presented on two specific domains: verbal fluency (measured by the Verbal Fluency Test) and executive functions (measured by the Clock Drawing Test). Even with some limitation, our results allow us to infer that exercises applied in different contexts

may have positive outcomes for people at a moderate stage of mixed dementia. Regarding its generalizability, we recommend that other studies should be carried out to clarify whether other interventions could attenuate cognitive decline.

### Clinical messages

- Balance and cognition are important components required for functional capacity.
- Multidisciplinary or physiotherapeutic interventions have positive outcomes on the balance of institutionalized elderly people with mixed dementia.
- Attenuation of decline in some cognitive domains is a relevant benefit provided by the multidisciplinary programme.

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## Effects of a physiotherapy and occupational therapy intervention on mobility and activity in care home residents: a cluster randomised controlled trial

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### ABSTRACT

**Objective** To compare the clinical effectiveness of a programme of physiotherapy and occupational therapy with standard care in care home residents who have mobility limitations and are dependent in performing activities of daily living.

**Design** Cluster randomised controlled trial, with random allocation at the level of care home.

**Setting** Care homes within the NHS South Birmingham primary care trust and the NHS Birmingham East and North primary care trust that had more than five beds and provided for people in the care categories "physical disability" and "older people."

**Participants** Care home residents with mobility limitations, limitations in activities of daily living (as screened by the Barthel index), and not receiving end of life care were eligible to take part in the study.

**Intervention** A targeted three month occupational therapy and physiotherapy programme.

**Main outcome measures** Scores on the Barthel index and the Rivermead mobility index.

**Results** 24 of 77 nursing and residential homes that catered for residents with mobility limitations and dependency for activities of daily living were selected for study: 12 were randomly allocated to the intervention arm (128 residents, mean age 86 years) and 12 to the control arm (121 residents, mean age 84 years). Participants were evaluated by independent assessors blind to study arm allocation before randomisation (0 months), three months after randomisation (at the end of the treatment period for patients who received the intervention), and again at six months after randomisation. After adjusting for home effect and baseline characteristics, no significant differences were found in mean Barthel index scores at six months post-randomisation between treatment arms (mean effect 0.08, 95% confidence interval -1.14 to 1.30;  $P=0.90$ ), across assessments (-0.01, -0.63 to 0.60;  $P=0.96$ ), or in the interaction between assessment and intervention (0.42, -0.48 to 1.32;  $P=0.36$ ). Similarly, no significant differences were found in the mean Rivermead mobility index scores between treatment arms (0.62, -0.51 to 1.76;  $P=0.28$ ),

across assessments (-0.15, -0.65 to 0.35;  $P=0.55$ ), or interaction (0.71, -0.02 to 1.44;  $P=0.06$ ).

**Conclusions** The three month occupational therapy and physiotherapy programme had no significant effect on mobility and independence. On the other hand, the variation in residents' functional ability, the prevalence of cognitive impairment, and the prevalence of depression were considerably higher in this sample than expected on the basis of previous work. Further research to clarify the efficacy of occupational therapy and physiotherapy is required if access to therapy services is to be recommended in this population.

**Trial registration** ISRCTN79859980

### INTRODUCTION

In the United Kingdom, 4% of the population over the age of 65 are resident in care homes, with this proportion increasing with age. Care homes in the UK are defined as either providing nursing care (nursing home) or not providing nursing care (residential care home). The occupants of residential care homes are, therefore, generally less dependent than those in nursing care homes, but the level of aid they require precludes them from living completely independently. Nursing homes are required to have at least one registered nurse within the staff.

Seventy five per cent of the population in nursing homes and residential care homes are severely disabled on at least one dimension of disability, with half of all residents dependent in self care tasks. It seems logical to expect that this population of frail elderly people who have mobility issues and are dependent in activities of daily living would receive rehabilitation services. Several surveys, however, have found that care home residents in the UK have limited access to rehabilitation services such as physiotherapy and occupational therapy. A 2001 study showed that only 3.3% of elderly nursing home residents receive occupational therapy, whereas only 10% receive physiotherapy, the majority of which is privately funded.<sup>1</sup> Physiotherapy and occupational therapy services are far more widely



available in other countries,<sup>2-4</sup> and are much more likely to be requested when costs are reimbursed.<sup>5</sup>

Implementing interventions that focus on behavioural change and mobility training in a frail, frequently cognitively impaired, elderly nursing home population is feasible<sup>6-10</sup>; however, interventions are difficult to maintain owing to the required treatment intensity and the cost.<sup>11</sup> The high levels of staff knowledge and skill required to continue treatment could be absent in the UK as training opportunities are scarce for care home staff.<sup>12-14</sup>

Evidence for the benefit of rehabilitation services in this population is conflicting and inconclusive. A recent trial concluded that a programme of functional rehabilitation had minimal impact for elderly people in residential care with normal cognition and no benefit for those with poor cognition.<sup>15</sup> Similarly, Mozley and colleagues found little or no evidence that occupational therapy reduces depression, dependency, or long term institutionalisation in elderly care home residents,<sup>16</sup> and Mulrow and colleagues found that physiotherapy provided only modest mobility benefits in very frail long stay US nursing home residents with physical disabilities.<sup>17</sup> In contrast, a UK study of care home residents with stroke related disability found that occupational therapy was beneficial in terms of maintaining self care independence.<sup>18</sup> Furthermore, two relatively recent systematic reviews found evidence that physical training had positive effects on mobility, physical functioning, and cognition in institutionalised elderly patients.<sup>19,20</sup> One of these reviews, however, concludes that there is contradictory evidence for the benefits of physical training on gait and activities of daily living.<sup>19</sup>

Physiotherapy and occupational therapy could be cost effective in elderly care home residents, in that therapy costs can be outweighed by a reduction in care requirement, reduced service use costs, and a fall in hospital admission rates.<sup>9</sup> However, two US studies found no statistically significant difference and a minor difference in cost between such interventions and routine care.<sup>21,22</sup>

The main objective of this trial was to evaluate the clinical effectiveness of a programme of physiotherapy and occupational therapy against standard care in care home residents with mobility limitations who are dependent on carers in some activities of daily living.

## METHODS

The register of care homes held by Birmingham City Council social services for 2004 was used to identify, within the boundaries of NHS South Birmingham and NHS Birmingham East and North primary care trusts, homes that had more than five beds and provided the care categories "physical disability" and "older people." From the register, 24 of 77 nursing and residential homes were selected that catered for residents with mobility limitations who are dependent in activities of daily living. Homes were purposely chosen to encompass variations in geographical location, size, and funding sector (table 1). Home managers were approached for consent and care homes were

subsequently recruited between June 2004 and June 2005 in three phases to spread both therapist and assessor workload.

At entry of a care home to the study, care home staff were asked to screen all residents with the Barthel index of activities of daily living and to provide information on cognitive status for consent purposes.<sup>23</sup> Residents who scored below 5 or over 16 on the Barthel index were excluded from the study on the basis that the intervention would be considered too intense or insufficient for their needs, respectively. Residents who were admitted to hospital with acute illness and those admitted to the care home for end of life care were also excluded.

Cognitively sound residents included in the study provided written informed consent. Residents with substantial cognitive impairment had consent provided by their next of kin. Consent was obtained for all residents before randomisation to minimise selection bias.<sup>24</sup> Pre-intervention assessments were completed before randomisation.

A cluster randomised controlled design was used to randomly allocate care homes to either the intervention arm or the control arm. Randomisation was performed by an independent principal statistician who used a computer generated randomisation list. Treatment arm was revealed to the treating therapists only, thereby ensuring that allocation was concealed from the independent assessors responsible for all subsequent assessments.

Residents in the intervention arm received a three month physiotherapy and occupational therapy intervention, whereas those in the control arm received standard care. The physiotherapy intervention was developed using a modified version of the protocol detailed by O'Neil and colleagues and the consensus of a steering group of expert physiotherapists.<sup>25</sup> Therapy was aimed at enhancing mobility and the ability to perform activities of daily living independently, and addressed components such as strength, flexibility, balance, and exercise tolerance. In addition, functional tasks such as bed to chair transfers, sit to stand, and walking or wheeling were practised. The intervention was delivered by two qualified physiotherapists and

**Table 1** Characteristics of care homes recruited to the study compared with all homes meeting eligibility criteria in south Birmingham

	Sample (n=24)	All homes (n=77)
<b>Number of homes by sector (n (%))</b>		
Private	18 (75)	51 (66)
Voluntary	3 (13)	10 (13)
Local authority	1 (4)	13 (17)
Housing association	2 (8)	3 (4)
<b>Number of homes by type of care (n (%))</b>		
Nursing	8 (33)	20 (26)
Residential	16 (67)	57 (74)
<b>Number of beds (median (min, max))</b>	35 (11, 76)	28 (7, 76)

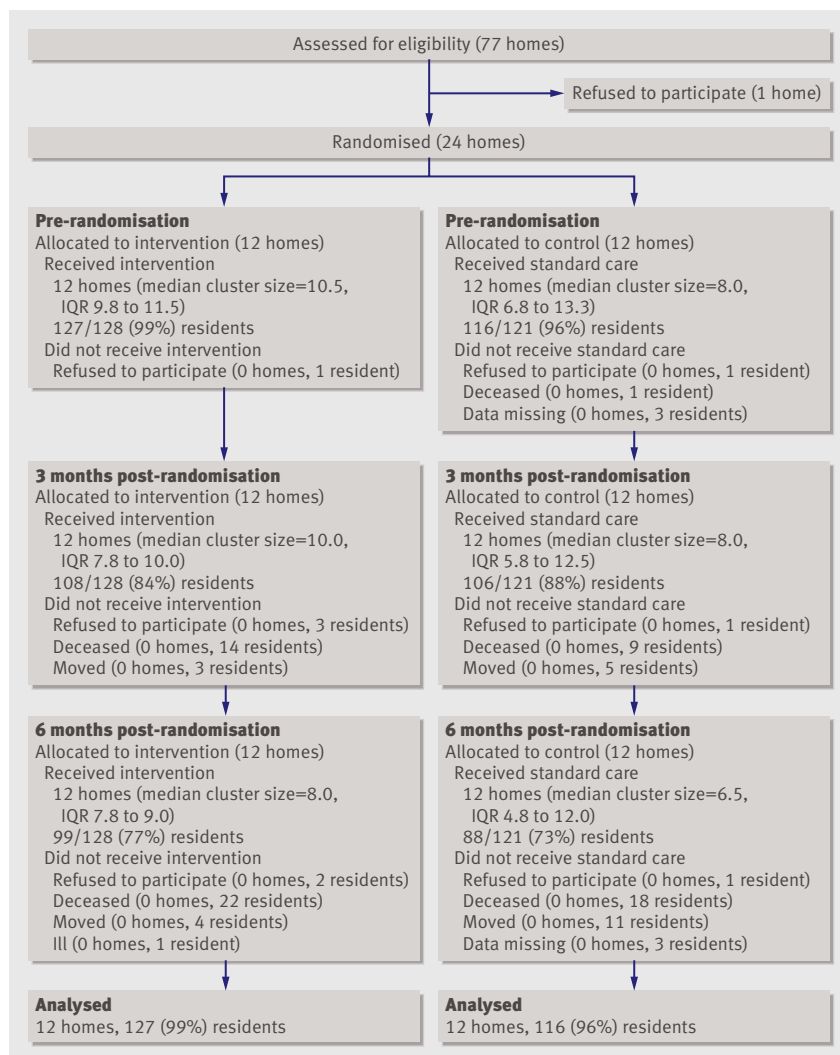


Fig 1 | CONSORT diagram. IQR, interquartile range

was adjusted for each individual to take into account their degree of ability. The level of treatment was based on an initial interview and assessment designed to establish individuals' physical and functional status and equipment needs.

The occupational therapy intervention was developed using the consensus of an occupational therapy steering group (as described by Sackley et al).<sup>26</sup> Therapy was targeted towards improving independence in personal activities of daily living such as feeding, dressing, toileting, bathing, and transferring (for example, from bed to chair). The intervention was delivered by two qualified occupational therapists who followed a client centred approach, including routine assessment, treatment, and reassessment. The dose, frequency, and duration of both physiotherapy and occupational therapy were dependent on the goals agreed by the individual participant and the therapists and on progress throughout the intervention.

The intervention arm also included an intervention delivered to the care home staff.<sup>27</sup> This involved a programme of staff training to provide practice in

promoting residents' independence and the use of therapeutic aids.<sup>28</sup>

Residents in care homes allocated to the control arm continued to receive standard care equal to that received before recruitment to the trial. Occupational therapy was not used routinely by any of the homes and physiotherapy was accessed only via general practitioner referral. None of the homes had an identified person with specific responsibility for mobility, training for activities of daily living, or the provision of adaptive equipment. The control group received the therapy intervention after the trial had ended.

### Outcome measures

Assessments were carried out by two independent assessors blinded to cluster allocation throughout the trial. Assessments were conducted before randomisation (baseline, between July 2004 and July 2005), at three months after randomisation (that is, at treatment completion for the intervention group; between October 2004 and October 2005), and at six months after randomisation (three month follow-up, between January 2005 and January 2006). The primary outcomes were the scores on the Barthel index and the Rivermead mobility index.<sup>29</sup> Measures of activities of daily living and of mobility were also selected as main outcomes because the intervention was targeted at a population in whom limitations in these parameters are highly prevalent.

In addition, the mini mental state examination was used at the first assessment to determine the level of residents' cognitive impairment (not an exclusion criterion).<sup>30</sup> Residents categorised as cognitively impaired (that is, those who scored less than 24 on the mini mental state examination) had their principal carer act as a proxy when completing subsequent primary outcome measures.

The timed "up & go" test was used to give a physical measure of mobility to support the primary measures.<sup>31</sup> We also anticipated that this test might highlight any false reporting by participants or carers on the primary measures.

Mood was assessed using the hospital anxiety and depression scale depression subscale.<sup>32</sup> Residents unable to complete the hospital anxiety and depression scale for reasons such as cognitive impairment and illness had the stroke aphasic depression questionnaire completed by a proxy.<sup>33</sup> Medical history and comorbidity information were also collected.

### Data analysis

This study was powered according to information from a pilot study,<sup>13</sup> which used an intracluster correlation of 0.18 and a standard deviation of 4 units to detect a difference of 2 units on the Barthel index at a significance level of 5% (80% power). A 2 point change on the Barthel index was thought to be a meaningful change in independence with respect to activities of daily living. A sample size of 300 was targeted to allow for participant withdrawal.

A detailed statistical analysis plan was developed prospectively in accordance with the extended CONSORT statement including cluster randomised trials.<sup>34,35</sup> Primary analyses for the Barthel index and Rivermead mobility index were conducted in accordance with the intention to treat principle and used all data recorded pre-randomisation, three months post-randomisation, and six months post-randomisation. The analyses were carried out by a statistician who was masked to group allocation, using SAS 9.1. Scores for the Barthel index and the Rivermead mobility index were summarised by treatment arm at each of the three assessments. Mean values and 95% confidence intervals were calculated, although confidence intervals were not adjusted for clustering. Analyses were conducted on individual data at a 5% level of significance.

Separate multilevel models were used to test the efficacy of the intervention according to Barthel index score and Rivermead mobility index score using responses at three months post-randomisation and six months post-randomisation. Respective centred pre-intervention scores were included in the model as a covariate.<sup>36,37</sup> Assessment was defined as a

repeated measures factor. Study group, assessment (three months post-randomisation and six months post-randomisation), and interaction between the two were modelled as fixed effects. Care home and participants were modelled as random effects. Models with different error structures were fitted.<sup>37</sup> Estimated effects and 95% confidence intervals are reported from the model of best fit.

Sensitivity analyses (using the same multilevel models) were conducted on Barthel index and Rivermead mobility index scores. Data were used from all participants who were assessed before randomisation and missing data were imputed through three mechanisms (best case scenario, worst case scenario, and missing mechanism). A further analysis was conducted using a complete data set (data from participants who provided data pre-intervention and were not protocol violators). No contradictory findings were found; therefore, only primary analyses have been reported in the results section.

A further analysis was conducted using separate multilevel models to test time standardised area under the curve values for Barthel index and Rivermead mobility index scores across follow-up assessments. Respective centred pre-intervention scores were included in the model as a covariate, study group was modelled as a fixed effect, and care home and participants were modelled as random effects. The same error structure was used as in the “best fit” model above. Estimated intervention effects and 95% confidence intervals are reported. The estimated value for the intraclass correlation coefficient was computed using pre-intervention scores on the Barthel index and the Rivermead mobility index.

## RESULTS

### Participants

A total of 24 homes and 249 participants were recruited to the trial. Twelve homes were randomised to each group, with 128 residents allocated to the intervention arm (median number per home=11) and 121 to the control arm (median number per home=8). Before the intervention started, six participants (one in the intervention group and five in the control group) had withdrawn from the study. This number increased to 35 by the time of the three month follow-up (20 in the intervention group and 15 in the control group), and 62 by the time of the six month follow-up (29 in the intervention group and 33 in the control group). Reasons for withdrawal are depicted in the consort diagram in fig 1.

Table 2 indicates participant demographics including age, gender, proportion of participants with confirmed stroke, level of cognitive impairment, and proportion of participants with a mood disorder.

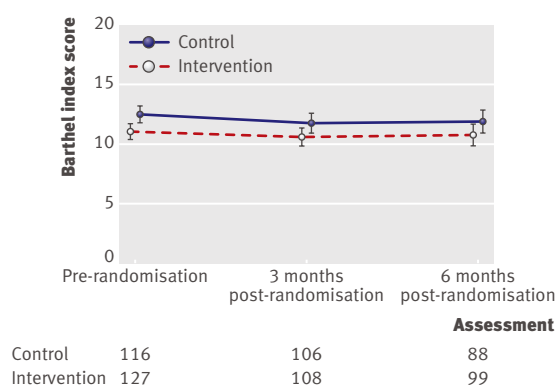
### Comorbidities

Comorbidities of the 249 residents who participated in the study were recorded and grouped into categories according to comorbidity type. The majority of comorbidities were musculoskeletal problems (57% of

**Table 2** | Baseline characteristics of care homes and participants by study group

	Study group		Combined
	Intervention	Control	
<b>Care home factors at baseline</b>			
Number of care homes	12	12	24
Median cluster size	10.5	8.0	10
Interquartile range	9.8 to 11.5	6.8 to 13.3	7.5 to 13.0
<b>Resident factors at baseline</b>			
Number of residents	128	121	249
Age (years; mean (SD))	86 (7)	84 (10)	85 (9)
Female (n (%))	101 (79)	84 (69)	185 (74)
At least one confirmed stroke (n (%))	28 (22)	26 (21)	54 (22)
<b>Mini mental state examination score (n (%))</b>			
<21	91 (71)	77 (64)	168 (67)
21-23	5 (4)	16 (13)	21 (8)
>24	32 (25)	28 (23)	60 (24)
<b>Hospital anxiety and depression scale (anxiety subscale) score (n (%))</b>			
0-7	42 (33)	49 (40)	91 (37)
8-10	7 (5)	9 (7)	16 (6)
11-21	6 (5)	7 (6)	13 (5)
<b>Hospital anxiety and depression scale (depression subscale) score (n (%))</b>			
0-7	44 (35)	55 (45)	99 (39)
8-10	7 (5)	7 (6)	14 (6)
11-21	4 (3)	3 (2)	7 (3)
<b>Stroke aphasic depression questionnaire score (n (%))</b>			
<14	16 (12)	6 (5)	22 (9)
≥14	52 (41)	37 (31)	89 (36)
Emotional distress	56 (44)	40 (33)	96 (39)
<b>Data missing (n (%))</b>			
Did not complete HADS or SADQ	5 (4)	13 (11)	18 (7)

Mini mental state examination: <21 cognitive impairment; 21-23 borderline; >24 cognitively sound. Hospital anxiety and depression scale (HADS): 0-7 normal; 8-10 borderline; 11-21 abnormal. Stroke aphasic depression questionnaire (SADQ): ≥14 depressed; <14 not depressed. Emotional distress: combines participants categorised as depressed on the SADQ and the HADS depression subscale.



**Fig 2** | Barthel index scores across groups and assessments (responders). The mean Barthel index scores for participants in the intervention group did not change notably over time and were not significantly different from those of participants in the control group

residents). Cardiovascular (23%), digestive (25%), and nervous system (30%) comorbidities were also common, as was stroke (24%), which was categorised independently. The most common specific comorbidities were arthritis (56%), stroke (46%), dementia (40%), and diabetes (36%).

#### Intervention

Tables 3 and 4 indicate the different categories within the physiotherapy and occupational therapy portions of the intervention, the total proportion of treatment time spent working on each category, and components within categories.

Out of 128 participants randomised, 123 received physiotherapy and occupational therapy to some degree. The mean number of physiotherapist visits was 6.4 per resident, with an average total contact time of 2.21 hours per resident. The mean number of occupational therapist visits was 9.8 per resident, with an average total contact time of 3.6 hours per resident.

No serious adverse events were observed in any of the clusters as a result of the intervention or assessments.

#### Primary analyses

Primary analyses were conducted on responses from 243 participants who completed pre-randomisation measures: 127 in the intervention group and 116 in the control group. Overall, participants exhibited a low level of independence before randomisation, with mean Barthel index scores of 11.1 and 12.5 in the intervention and control groups, respectively (table 5). Furthermore, very low levels of mobility were evident pre-randomisation, with mean Rivermead mobility index scores of 5.8 and 6.9 in the intervention and control groups, respectively (table 4).

No statistically significant differences were found between the study groups on mean scores for Barthel index or Rivermead mobility index (adjusting for clusters) at either three months post-randomisation or six months post-randomisation.

Intracluster correlation coefficient values of 0.49 and 0.48 were calculated using pre-intervention scores on Barthel index and Rivermead mobility index, respectively.

Once adjusted for home effect and pre-intervention scores, none of the differences in mean Barthel index scores between study groups at six months post-randomisation follow-up reached the minimal important difference threshold of 2 index points (mean effect 0.08, 95% confidence interval  $-1.14$  to  $1.30$ ;  $P$  value=0.90, table 6). Likewise, the minimal important difference value of 2 index points was not reached for the differences in mean Barthel index scores across assessments (mean effect  $-0.01$ ,  $-0.63$  to  $0.60$ ;  $P=0.96$ ) or for the interaction between intervention and assessment (mean effect  $0.42$ ,  $-0.48$  to  $1.32$ ;  $P=0.36$ ). No differences were statistically significant.

Once adjusted for home effect and pre-intervention scores, the minimal important difference threshold of 3 index points was not reached for mean Rivermead mobility index scores at six months post-randomisation across study groups (mean effect  $0.62$ , 95% confidence interval  $-0.51$  to  $1.76$ ;  $P=0.28$ ), across assessments (mean effect  $-0.15$ ,  $-0.65$  to  $0.35$ ;  $P=0.55$ ), or for the interaction between intervention and assessment (mean effect  $0.71$ ,  $-0.02$  to  $1.44$ ;  $P=0.06$ ).<sup>38</sup> No differences were statistically significant.

**Table 3** | Proportion of treatment time spent on each component of the physiotherapy portion of the intervention

	Proportion of total treatment time (%)
<b>Assessments</b>	<b>45.42</b>
Initial interview	25.98
Review	17.54
Goal setting	0.67
Other	1.23
<b>Mobility and transfers</b>	<b>30.28</b>
Bed mobility	0.52
Transfers	14.14
Standing	3.93
Walking	10.98
Other	0.71
<b>Impairment</b>	<b>17.98</b>
Strength	6.40
Balance	3.77
Flexibility	4.61
Endurance	0.15
Group exercise	1.41
Other	1.64
<b>Equipment</b>	<b>0.37</b>
Ambulation/orthopaedic aid	0.37
<b>Communication</b>	<b>5.95</b>
Referrals	0.31
Liaison	3.47
Caregiver education	0.36
Resident education and techniques	1.81
<b>TOTAL</b>	<b>100</b>

**Table 4 | Proportion of treatment time spent on each component of the occupational therapy portion of the intervention**

	Proportion of total treatment time (%)
<b>Mobility and activities of daily living</b>	<b>41.14</b>
Transfers and mobility	27.60
Group exercises	7.75
Activities of daily living training	5.79
<b>Assessments</b>	<b>35.75</b>
Initial interview	21.89
Review	12.59
Goal setting	1.27
<b>Adaptations</b>	<b>12.41</b>
Adaptive equipment	8.30
Wheelchairs and seating	2.9
Environmental adaptations	1.21
<b>Communication</b>	<b>9.02</b>
Referrals	4.08
Liaisons	3.02
Information	1.19
Caregiver training	0.38
Resident education and techniques	0.35
<b>Other</b>	<b>1.68</b>
<b>TOTAL</b>	<b>100</b>

Profile plots of mean Barthel index scores (fig 2) and mean Rivermead mobility index scores (fig 3) for participants at any assessment show that the intervention did not improve the scores of the treatment group over those of the control group.

In analyses on area under the curve values, no significant differences were found across study groups on Barthel index score (mean effect 0.54, 95% confidence interval -0.69 to 1.77; P=0.37) or Rivermead mobility index score (mean effect 1.11, -0.14 to 2.36; P=0.078; table 6).

The results of the timed “up & go” test were not analysed as this outcome was found to be inappropriate for use in our study population. The very large amounts of missing data for this variable and the huge variation in times among participants who did complete the measure meant it was not possible to analyse and draw any meaningful conclusion from the data.

**DISCUSSION**

The results of our study suggest that the three month occupational therapy and physiotherapy programme was not effective in promoting independent living and mobility among care home residents over and above that achieved with standard care.

The intervention was based on “best practice” approaches developed according to clinical evidence and expert views. Evidence exists to support occupational therapy and particular aspects of physiotherapy after stroke, but little evidence is available to support more widespread use of physiotherapy and occupational therapy.<sup>39</sup> Much of the practice of occupational therapy and physiotherapy is not evidence based,

however, or even theory based, but has developed through practice and opinion. One could, therefore, argue that the absence of positive findings in our study could be because the intervention was inappropriate for the target group, thus resulting in no measurable benefits. The intervention dose varied between individuals as it was dependent on participants’ and therapists’ agreed goals and on progress throughout the intervention period. A different dose could potentially be more beneficial.

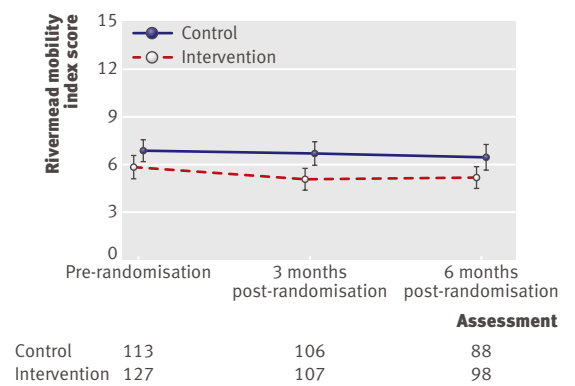
**Comparison with other studies**

Previous studies of physiotherapy and occupational therapy in this setting provide conflicting results.<sup>15-20</sup> Results of this trial, however, seem to support those of the studies mentioned previously, which concluded that similar functional rehabilitation interventions had minimal impact on elderly people in residential care.<sup>10-13</sup>

**Limitations**

Certain characteristics of the population were unexpected, which could suggest that a larger sample is required. The intraclass correlation coefficients of 0.49 and 0.48 for the Barthel index and Rivermead mobility index, respectively, were higher than was anticipated from the sample size calculation conducted; however, similar intraclass correlation coefficients were observed in a study with participants from a similar population.<sup>40</sup> In addition, an analysis of a large number of studies that used intraclass correlation coefficients concluded that the magnitude of between cluster variation for a given measure can rarely be estimated in advance.<sup>41</sup>

In this study, care home residents were included in the trial if they scored in the mid-range on the Barthel index. It is worth noting that initial Barthel index screening was carried out by care home staff, and some residents did not score within the inclusion parameters when subsequent baseline assessments were done. We decided that these residents should remain in the trial. The inclusion of these residents could pos-



**Fig 3 | Rivermead mobility index scores across groups and assessments (responders). The mean Rivermead mobility index scores for participants in the intervention group did not change notably over time and were not significantly different from those of participants in the control group.**

**Table 5** | Summary statistics of Barthel index and Rivermead mobility index scores

	Study group			
	Intervention		Control	
	n	Mean (95% CI)	n	Mean (95% CI)
<b>Barthel index score</b>				
Pre-randomisation	127	11.1 (10.4 to 11.9)	116	12.5 (11.7 to 13.2)
3 months post-randomisation	108	10.6 (9.8 to 11.4)	106	11.8 (10.9 to 12.6)
6 months post-randomisation	99	10.7 (9.8 to 11.6)	88	11.9 (10.9 to 12.9)
<b>Rivermead mobility index score</b>				
Pre-randomisation	127	5.8 (5.1 to 6.5)	113	6.9 (6.2 to 7.5)
3 months post-randomisation	107	5.1 (4.4 to 5.8)	106	6.7 (6.0 to 7.5)
6 months post-randomisation	98	5.2 (4.5 to 6.0)	88	6.5 (5.7 to 7.3)

sibly have masked intervention benefits slightly because the intervention would be of insufficient intensity to be beneficial in these individuals.

Another limitation is the absence of physical performance data. The timed “up & go” test was used as an outcome measure; however, the majority of participants were unable to complete the task, thus precluding analyses on this outcome. Other research suggests that an inability to complete the timed “up & go” test is associated with poor health and mortality.<sup>42</sup>

The study could also be criticised because all residents with the defined level of dependency were referred for physiotherapy and/or occupational therapy, yet in routine clinical practice only those with a specific problem would be referred. Essentially, the therapists were in some cases delivering interventions that maintained the physical abilities of the residents rather than actively rehabilitated them. In addition, it could be argued that the setting of this study does not lend itself to improvements in independence that could be recorded with the outcome measures selected because of the standard institutional risk policies in place. It could potentially be difficult to improve independence in an environment where policies require residents to be assisted in certain activities, whether they are capable or not. For example, nearly all

**Table 6** | Summary of effects at six months post-randomisation in the multilevel model for Barthel index and Rivermead mobility index, adjusted for home effect and pre-intervention scores

	Outcome measure			
	Barthel index		Rivermead mobility index	
	Estimate (95% CI)	P value	Estimate (95% CI)	P value
<b>Repeated measures analysis</b>				
Intervention	0.08 (-1.14 to 1.30)	0.90	0.62 (-0.51 to 1.76)	0.28
Assessment	-0.01 (-0.63 to 0.60)	0.96	-0.15 (-0.65 to 0.35)	0.55
Interaction	0.42 (-0.48 to 1.32)	0.36	0.71 (-0.02 to 1.44)	0.057
Covariate	0.71 (0.59 to 0.83)	<0.0001	0.61 (0.50 to 0.72)	<0.0001
<b>Area under the curve analysis</b>				
Intervention	0.54 (-0.69 to 1.77)	0.37	1.11 (-0.14 to 2.36)	0.078
Covariate	0.72 (0.59 to 0.84)	<0.0001	0.60 (0.49 to 0.71)	<0.0001

homes have a policy of assisted bathing as this activity of daily living would involve a high risk of falls if done independently by this population.

### Future research

Given that this area of research is relatively novel, the optimum intervention dose has yet to be established. Future research should investigate varying intensities and doses of therapies of this type. In addition, future studies could use a more selective approach to intervention delivery, as in practice only those individuals referred for therapy would receive such services. However, research has shown that care home staff often do not know when or who to refer for rehabilitation therapy.<sup>43</sup> Thus, a careful selection process would need to be adopted to prevent the main objectives of such research being jeopardised.

This study was novel in that an observational measure of emotional distress was used for residents who scored less than 24 on the mini mental state examination. The levels of emotional distress recorded were much higher than predicted. Depression would certainly reduce the ability to engage in therapy and to retain any improvement and could, therefore, be a factor in the apparent lack of intervention benefit in this study. Future studies could analyse the different responses to therapy of individuals with varying levels of emotional distress.

### Other considerations

One issue in care homes in the UK is the ability of staff to recognise which residents have maintenance or rehabilitation potential. One recent study found that stroke patients in nursing homes who were less likely to receive rehabilitation actually appeared to benefit more from therapy than did more typical candidates.<sup>19</sup> There seems to be a need for nurses and care home staff to be better educated with regard to identifying rehabilitation potential in care home residents.<sup>43</sup>

### WHAT IS ALREADY KNOWN ON THIS TOPIC?

Care home residents have greater dependence in activities of daily living than do community dwelling elderly people

Care home residents have limited access to physiotherapy and occupational therapy

Research is inconclusive as to whether such therapies are beneficial in this population and, subsequently, a cost effective service

### WHAT THIS STUDY ADDS

The three month physiotherapy and occupational therapy intervention delivered did not prove more beneficial than standard care in this sample

The prevalence of mood disorders and cognitive impairment was greater than was previously anticipated

The findings do not support the argument that such services would be cost effective and reduce burden on care staff and society

## Conclusion

The physiotherapy and occupational therapy intervention administered in this study resulted in no measurable improvements in functional independence and mobility. It may be hasty to conclude that physiotherapy and occupational therapy have absolutely no value in this population. From the outcomes of this study, however, one could conclude that these therapies do not have an effect on independence and mobility when applied relatively unselectively. In addition, it seems that the results do not support the provision of such services. Further research could investigate a concurrent intervention to address the apparent prevalence of mood disorders and cognitive impairment in this population. Until more conclusive findings are available, current practice and access to rehabilitation therapy services in this population are unlikely to change.

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**Contributors:** CMS was principal investigator and led the design, management, and writing up of the trial. TJH and KH were responsible for the coordination of the trial, the independent assessments, and data management. TJH also contributed to the design of the study and was responsible for writing up the trial for publication. CCW and SP were responsible for the development of the statistical analyses plans, conducting the analyses, and written presentation of the results. MEvdB and KL contributed to the design of the intervention protocol and administered the physiotherapy and occupational therapy components of the intervention, respectively.

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# Power Mobility for a Nursing Home Resident With Dementia

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## KEY WORDS

- cognition
- dementia
- interpersonal relations
- mobility limitation
- socialization
- wheelchairs

**OBJECTIVE.** This case study describes an occupational therapy intervention to increase the self-mobility and social participation of a nursing home resident with dementia using a power wheelchair equipped with a collision-prevention system.

**METHOD.** We used an exploratory case study design. Data sources included the medical record, standardized assessments, interviews, observations of daily activities, and a driving log.

**RESULTS.** During driving sessions, changes in affect such as smiling and attempts to socialize were noted. The resident required ongoing prompting to operate the modified power wheelchair.

**CONCLUSION.** The resident was unable to achieve self-mobility with an intervention involving a modified power wheelchair. However, this study demonstrates that even supervised mobility can have a positive impact on affect and social participation. Observations from this study are being applied to the design and testing of the next generation of power wheelchairs intended for use by nursing home residents with dementia.

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Many older adults have chronic health conditions that limit their mobility. For those who live in institutions, independent mobility is essential to quality of life (Bourret, Bernick, Cott, & Kontos, 2002) and a fundamental action that enables engagement in self-care, leisure, and social participation. Occupational therapists often promote mobility by providing wheelchairs, and for residents who do not have the physical capacity to move a manual wheelchair, therapists may recommend power wheelchairs. Various reports have described the benefits of power wheelchairs for older adults (Brandt, Iwarsson, & Stahle, 2004), the assessment (Dawson, Chan, & Kaiserman, 1994) and training (Hall, Partnoy, Tenenbaum, & Dawson, 2005) of nursing home residents for power wheelchair use, and safety concerns related to use of these devices in nursing homes (Mortenson et al., 2005). Despite the research and practice knowledge available, residents who are physically unable to move a manual wheelchair, yet have dementia or other conditions that limit them from safely operating a power wheelchair because of inadequate attention, learning capability, safety awareness, and judgment, still present a challenge to therapists. To date, no effective interventions have been developed to assist these residents, and they remain dependent on others to move them from place to place.

Advances in technology offer the possibility of power mobility for people not normally considered capable of driving power wheelchairs by compensating for physical and cognitive deficits. A review by Simpson (2005) described  $\geq 46$  “smart” power wheelchair projects at various stages of development, but to date, only a few have focused on the needs of those living in nursing homes. Wang, Gorski, Holliday, and Fernie (2007) reported that a power wheelchair adapted with a contact sensor skirt helped residents with cognitive impairment to compensate for

delayed reaction times and prevented injury and property damage. Mihailidis, Elinas, Boger, and Hoey (2007) suggested that intelligent collision avoidance and navigation assistance for power wheelchairs have the promise to enable mobility and decrease caregiver dependence for residents with cognitive impairment.

This new technology means that therapists will be involved in evaluating novel interventions to enhance occupational performance and engagement. In examining how a new power wheelchair intervention can improve mobility and enable goal achievement, a conceptual model of practice such as the Canadian Model of Occupational Performance–Engagement (CMOP–E; Townsend & Polatajko, 2007) may be used to frame interventions. The CMOP–E defines the dynamic interactions of the: person, environment, and occupation. Therapists assess physical, cognitive, and affective performance components of the person and analyze physical, social, cultural, and institutional environmental factors. Using this framework, therapists may modify the person, the environment, or the occupation to enable performance or engagement. A power wheelchair may be viewed as an environmental modification that alters how an occupation is performed.

Because power wheelchairs have not previously been available to people with dementia, little research evidence is available to guide therapists on how best to facilitate power wheelchair use. A good starting point is assumed to involve a cognitive rehabilitative approach using some fundamental guiding principles, as described by Boccardi and Frisoni (2006). To facilitate performance with people with dementia, Boccardi and Frisoni identified the need to ensure that the person has the motivation to participate and suggested stimulating intact cognitive skills, breaking tasks down into subtasks, and grading activity requirements. Stimulation of intact cognitive skills, particularly procedural memory, may work to help power wheelchair operation. Power wheelchair use can be facilitated by offering the person supported opportunities to drive and by grading the complexity of driving skills to match the person's abilities. Procedural memory, part of the implicit memory system that pertains to learned skills, is fairly well preserved in people with dementia, and stimulation of these preserved memories is believed to be a viable method to promote skill performance (DeVreese, Neri, Fioravanti, Belloi, & Zanetti, 2001). Residents' memory for the cause-and-effect relationship of using a joystick to move and the process of navigating through the environment may be intact because they may have operated joystick-controlled vehicles in the past (Hall et al., 2005). To support correct driving performance, another cognitive rehabilitative strategy such as the system of least prompts may be used (Doyle, Wolery, Ault, & Gast,

1988). Some studies have described the application of the system of least prompts with older adults with dementia to facilitate daily skills performance with some effect (Labelle & Mihailidis, 2006). This strategy involves a progression from minimally intrusive verbal prompting to more involved demonstrations of targeted behaviors to assist performance.

## Objective

The objective of this exploratory case study was to evaluate the outcome of an anticollision power wheelchair intervention to enable self-mobility for Mr. Z., a nursing home resident with dementia, thus facilitating his social participation. This case was part of a larger study that examined the effect of anticollision power wheelchair use on nursing home residents with cognitive impairment.

## Method

We used an exploratory case study approach as defined by Yin (2003) and used the CMOP–E to frame the intervention. Data sources included the medical record, results from standardized assessments, interviews, structured observations, and driving logs. Mr. Z.'s medical and social histories and previous driving experiences were collected from the medical record. Pamela Holliday administered the Mini-Mental State Examination (Folstein, Folstein, & McHugh, 1975), Dementia Rating Scale–2 (Jurica, Leitten, & Mattis, 2001), and FIM® (Uniform Data System for Medical Rehabilitation, 1997). Rosalie Wang interviewed the resident and his caregivers (two nurses, a music therapist, and two recreation therapy staff) to formulate a suitable occupational performance goal. Holliday, Wang, or one of two trained research assistants made structured observations of Mr. Z.'s daily activities at 5-min intervals during five randomly selected 2-hr blocks each week for the duration of the study. Wang conducted the driving training sessions and completed a log that included summaries of the skills instructed; training strategies used; and Mr. Z.'s driving behavior and performance, affect, and social interactions. Wang also documented comments made by others on his driving and the impact of driving during and after completion of the sessions. Observations from others helped to corroborate the findings and minimize investigator bias. We reviewed all data sources and summarized common ideas relevant to the intervention's outcomes. The study was approved by the research ethics board of the hospital where it was conducted. Informed consent was granted by Mr. Z.'s substitute decision maker and assent was granted by Mr. Z.

## Participant

Mr. Z. was an 83-year-old man with a diagnosis of mixed Alzheimer's and vascular dementia. Mr. Z. was selected purposefully from among participants in the larger study. He had complex physical and cognitive limitations, with dementia at the lower limit of the inclusion criteria for the larger study. His score on the FIM was 26 of 126, indicating maximum to total assistance for daily activities. Mr. Z. had been living in the nursing home for almost 4 years. He was previously an Air Force pilot and had experience with using a joystick. Mr. Z.'s physical, cognitive, and affective performance components are summarized in Table 1.

## Environment

The study was conducted in a nursing home in Toronto, Ontario, on a nursing unit that provided maximum personal care support for residents with severe physical and cognitive impairments. He lived in a four-bed room with three others. Mr. Z. spent the majority of his time in the lounge in front of the television. There were no power wheelchairs used on this nursing unit before this study.

## Occupation

Mr. Z. enjoyed social contact with others, and while sitting in the lounge he often sought contact by looking at people, reaching out with his arm, or initiating conversation. One staff member stated, "He likes to be with other people. He very much likes to be a part of the group. And he will be as involved as he can be . . . because he has a sense of humor, too." His access to other people with whom to interact was often limited because he was unable to physically move to others' locations. His interactions appeared dependent on other people approaching him. On many occasions, he would reach out his hand and speak, but people did not notice him.

We formulated the goal of enabling self-mobility to increase social participation after observing Mr. Z.'s behaviors and speaking with him and the five primary staff who worked with him. Because of his dysarthria, aphasia, and cognitive impairment, he was unable to name a specific goal, but it was apparent that he was motivated by social participation. The nursing, music and recreational therapy, and research staff agreed that participation in the study and the potential to be mobile might increase his social opportunities.

## Intervention

We proposed an environmental intervention to compensate for Mr. Z.'s personal limitations and modify elements influencing his social participation performance. Specifically, we proposed that facilitated use of an anticollision power wheelchair that compensated for decreased awareness of, or response time to, environmental obstacles and prevented collisions would allow Mr. Z. to safely and more independently access people with whom to socialize. Mr. Z. would ideally be able to move around safely and freely in his room and the communal areas, although use of the power wheelchair would be restricted to the indoor nursing home setting where staff were available for periodic assistance.

The anticollision power wheelchair used in this study was previously described in Wang et al. (2007). A Nimble Rocket™ power wheelchair (Nimble Inc., Toronto, Ontario) was modified, as in Figure 1, so that a very low force (an estimated 1–N) contact with the sensor skirt surrounding the base of the wheelchair caused movement to stop. The skirt was designed to collapse without applying additional force during the distance required to bring the wheelchair to a gentle full stop. Only movement away from the obstacle was then permitted. Mounted beside the joystick controller were indicator lights that displayed the directions in which movement was allowed, as shown in Figure 2. The

**Table 1. Mr. Z.'s Physical, Cognitive, and Affective Performance Components**

Physical	Cognitive	Affective
<ul style="list-style-type: none"><li>• Blurred vision in right eye, cataracts, strabismus in left eye</li><li>• Dysarthria</li><li>• Paraplegia</li><li>• Transfer: mechanical lift, assistance of one person</li><li>• Seating: tilt-in-space manual wheelchair</li><li>• Wheelchair mobility: Did not often initiate mobility, hand propelled short distances at 0.08 m/s (from bed to bedroom door) with verbal prompting and manual guidance, tended to veer to right side and bumped into walls and furniture</li></ul>	<ul style="list-style-type: none"><li>• 12/30 on Mini-Mental State Exam (moderate dementia)</li><li>• 72/144 on Dementia Rating Scale–2 (severe cognitive impairment)</li><li>• Mild to moderate receptive and expressive aphasia</li><li>• Fluctuating level of alertness, sleepy after meals</li><li>• Alert and responsive during social interactions</li><li>• Followed one-step directions with gestures and references to environment</li><li>• Difficulty maintaining attention and retaining information; disoriented to place; staff noted that he was aware of his surroundings</li></ul>	<ul style="list-style-type: none"><li>• Positive when socializing with others</li><li>• Smiled often</li><li>• Slept in wheelchair when not interacting with others</li><li>• Displayed discontent by turning his head away or grimacing (e.g., occasionally during personal care)</li></ul>



**Figure 1. Anticollision power wheelchair.**

maximum forward speed of the power wheelchair was set at 0.24 m/s (approximately 20% of an average walking speed).

The basic and complex driving skills required to operate the modified power wheelchair in the indoor nursing home setting are shown in Table 2. The performance components



**Figure 2. Joystick controller with indicator lights.**

**Table 2. Basic and Complex Driving Skills for Use of Modified Power Wheelchair**

Basic	Complex
<ul style="list-style-type: none"> <li>• Turn power on and off</li> <li>• Drive forward</li> <li>• Drive backward</li> <li>• Turn right, left, 180°</li> <li>• Navigate around obstacles</li> <li>• Navigate away from obstacle when contacted</li> </ul>	<ul style="list-style-type: none"> <li>• Drive in congested areas (e.g., entertainment hall)</li> <li>• Drive in small spaces (e.g., bathroom)</li> <li>• Park (e.g., beside bed or under dining table)</li> <li>• Back-in park or back out of small space</li> <li>• Get on and off elevators</li> </ul>

or abilities necessary to participate in the driving sessions are listed in Table 3. In a preliminary evaluation of Mr. Z.'s abilities and the driving requirements, we found that Mr. Z. had sufficient capacity to participate in the driving sessions using the modified power wheelchair. Mr. Z.'s strong social tendencies and motivation to be around other people were also important factors in determining his suitability for the proposed intervention.

Driving training sessions were conducted on Mr. Z.'s nursing unit. The approach to facilitate driving performance was dynamic, interactive, and based on procedural memory stimulation and the system of least prompts. According to the system of least prompts, a simple verbal prompt (e.g., drive forward) was delivered first. If this prompt did not achieve the correct performance, then pointing combined with the same verbal prompt was tested. If this prompt was also unsuccessful, gestures were tried. Maximally assistive hand-over-hand guidance was used if gestures were unsuccessful. In this case, the trainer (Wang) physically guided Mr. Z.'s hand through the appropriate movement sequence. Reinforcements or corrections were provided after correct or incorrect behaviors were observed. Care was taken to limit distractions and to monitor fatigue or sensory overload. Progress was evaluated after 12 sessions to determine whether continued training would be beneficial.

## Results

The intervention as implemented encouraged but did not sustain social participation because Mr. Z. was unable to operate the power wheelchair on his own. He drove for 12 sessions, each approximately 1 hr in duration, over 4 weeks. Although use of the power wheelchair appeared to be a positive experience for him, he required ongoing support to use it.

From his agreement to drive the power wheelchair and heightened level of alertness, frequency of smiling, and attempts to make social contact with others while driving, the research staff and his caregivers inferred that the intervention

**Table 3. Performance Components Necessary to Use Modified Power Wheelchair**

Physical	Cognitive	Affective
<ul style="list-style-type: none"> <li>• Sitting tolerance to drive for approximately 1 hr</li> <li>• Upper-extremity coordination, strength, range of motion, and hand dexterity sufficient to operate power button and joystick</li> <li>• Vision to see indicator lights on wheelchair controller (not absolute requirement)</li> </ul>	<ul style="list-style-type: none"> <li>• Alertness and awareness of surroundings</li> <li>• Follow one-step directions (verbal or nonverbal) to participate in driving sessions</li> <li>• Verbal or nonverbal ability to communicate needs</li> <li>• Attention to immediate task</li> <li>• Track movement of objects in environment</li> <li>• Conceptual understanding of power button, joystick directions (and indicator lights, but not absolute requirement)</li> <li>• Procedural memory for use of power button and joystick</li> <li>• Initiation to use joystick to start driving</li> </ul>	<ul style="list-style-type: none"> <li>• Motivation to participate and to be mobile</li> </ul>

had a positive impact on his affect and social participation. During the sessions, he tended to drive up to staff, initiate greetings, watch what they were doing, listen to them talking, and make jokes. On one occasion, he drove up to the unit clerk and said clearly, “How do I get out of here?” and smiled. On another occasion, he spontaneously waved his left arm in the air and said, “Where is my lasso?” in a joking fashion. The staff also encouraged his driving and offered many positive comments when he drove up to them. Several of the staff commented that they were surprised that he could move the power wheelchair because they rarely observed him moving his manual wheelchair.

Mr. Z. was able to use the power button, drive forward continuously, and turn right, left, and 180° with one-step concrete verbal prompts and gestures. He was able to navigate away from some obstacles when driving, but when an obstacle was contacted, he required verbal prompts and hand-over-hand assistance to navigate away. Complex skills were not attempted. Mr. Z. only occasionally initiated movement of the joystick, and prompting was required for most of his driving. He was easily distracted by sounds or other people around him. He demonstrated poor short-term recall for instructions. Although Mr. Z. always wanted to continue driving when asked, for sessions longer than approximately 1.25 hr, he appeared fatigued and slower to respond to prompts or obstacles. Hence, the anticollision power wheelchair, although designed to prevent collisions, was unable to compensate for his decreased initiation, motor planning, and new learning. Including preparation and take-down time, approximately 2 hr of trainer time were required for each driving session. The degree of support required for Mr. Z.’s continued use of the power wheelchair was high.

## Discussion

This study is the only one of which we are aware that examines the outcome of a power mobility intervention for a nursing

home resident with limited mobility and dementia, primarily because the technology has not previously been available for clinical use. When this study was undertaken, we were uncertain how residents with severe cognitive impairment would respond and whether this type of intervention would be worthwhile to pursue with these residents. This study’s outcomes were intended to guide future work to develop more effective interventions, identify suitable candidates for testing, and develop more rigorous study protocols.

The CMOP–E was a useful framework in which to position this intervention in an occupational therapy context. Because the focus of this case was on examining Mr. Z.’s response to the power wheelchair intervention and determining whether there might be some benefit, we did not explore other avenues to address the goal of increasing social participation.

Mr. Z.’s affective behavior was positive, and his social participation was enhanced while driving. Because he was not able to move himself in the power wheelchair without prompting, observed benefits could not be sustained, and we could not assess the intervention’s longer-term impact. This case illustrates, however, that a resident with complex physical and cognitive limitations can continue to experience positive affect through participation. This result is encouraging and suggests that this intervention may be worthwhile to pursue. However, further study of intervention effects using more rigorous techniques to document behaviors and social participation is recommended.

As anticipated, this study also revealed how the anticollision power wheelchair requires further development to ensure usability for residents with severe cognitive impairment. The ability of the power wheelchair control system to prevent collisions by stopping automatically protected the safety of residents and property but was not sufficient to enable Mr. Z. to drive the power wheelchair on his own. To use a power wheelchair, he required prompting from staff or a more sophisticated wheelchair control system able

to provide automated prompting and guidance. The anti-collision power wheelchair tested in this study may be of more benefit to residents with greater initiation and motor planning abilities.

The foundations for facilitating power wheelchair use for Mr. Z. were based on a cognitive rehabilitative approach using procedural memory stimulation and the system of least prompts. We presumed that when presented with a joystick that controlled the movement of a vehicle, a resident with previous experience using joysticks such as in piloting a plane would tap into previously learned skills and use the joystick to move the power wheelchair. We expected the system of least prompts to promote correct performance. For the most part, this case supported these approaches.

## Future Research

As a result of this exploratory case study, we have several recommendations to improve the design of future studies and the power wheelchair intervention for nursing home residents with dementia. We did not examine the preservation of procedural memory for joystick use and driving and the extent of transfer of these skills, but they warrant further exploration. Future studies should also address the limitations in the study's design because we did not collect quantitative data for prompts, reinforcements, and corrections applied during the driving sessions. Subsequent studies should include video recordings of the driving sessions; coding of the prompts, reinforcements, and corrections delivered; and analysis of the performance outcomes.

Suggestions to improve the design of the power wheelchair for a clinical group with decreased driving initiation and motor planning include an automated prompting system, enhanced feedback to assist the driver with navigating around the environment or away from obstacles, and possibly a semiautonomous driving control system.

## Conclusion

This case demonstrates that an intervention involving use of a modified power wheelchair was unable to facilitate sustained social participation for a nursing home resident with dementia and severe cognitive impairment because self-mobility was not achieved. However, this resident showed that even supervised mobility can have a positive effect on affective experience and social participation. We have gained valuable information that is being applied to the design and testing of the next generation of power wheelchairs intended for use by nursing home residents with dementia. ▲

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