Complete Summary

GUIDELINE TITLE

Wheelchair biking for the treatment of depression.

BIBLIOGRAPHIC SOURCE(S)

Wheelchair biking for the treatment of depression. Iowa City (IA): University of Iowa Gerontological Nursing Interventions Research Center, Research Dissemination Core; 2003 Feb. 53 p. [86 references]

GUIDELINE STATUS

This is the current release of the guideline.

COMPLETE SUMMARY CONTENT

SCOPE
METHODOLOGY - including Rating Scheme and Cost Analysis
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SCOPE

DISEASE/CONDITION(S)

Depression

GUIDELINE CATEGORY

Evaluation
Management
Risk Assessment
Treatment

CLINICAL SPECIALTY

Geriatrics
Nursing
Psychiatry

INTENDED USERS

Advanced Practice Nurses
Health Care Providers
Nurses
Physicians

GUIDELINE OBJECTIVE(S)

- To describe a specific recreation therapy program, wheelchair biking, for the treatment of depression in older adults, with and without cognitive impairments
- To reduce depressive mood in older adults and to provide a complementary or alternative treatment to medications

TARGET POPULATION

Older adults in long-term care facilities who are depressed or at risk for depression

INTERVENTIONS AND PRACTICES CONSIDERED

1. Use of assessment criteria in the selection of clients for the wheelchair biking program through use of Geriatric Depression Scale (short or long form) or Cornell Scale for Depression in Dementia
2. Assessment of resident´s ability to participate safely in wheelchair biking program
3. Training of staff and implementation of wheelchair biking (Duet™ Tandem Wheelchair Bicycle) program

MAJOR OUTCOMES CONSIDERED

Risk of undiagnosed/untreated depression

METHODOLOGY

METHODS USED TO COLLECT/SELECT EVIDENCE

Hand-searches of Published Literature (Primary Sources)
Hand-searches of Published Literature (Secondary Sources)
Searches of Electronic Databases

DESCRIPTION OF METHODS USED TO COLLECT/SELECT THE EVIDENCE

Searches of Medline were performed using the following keywords: biking and older adults; depression and geriatrics; depression and nursing homes; depression and nursing homes and psychosocial.

NUMBER OF SOURCE DOCUMENTS

43

METHODS USED TO ASSESS THE QUALITY AND STRENGTH OF THE EVIDENCE

Weighting According to a Rating Scheme (Scheme Given)

RATING SCHEME FOR THE STRENGTH OF THE EVIDENCE

The grading schema used to make recommendations in this evidence-based practice protocol is:

A. Evidence from well-designed meta-analysis.
B. Evidence from well-designed controlled trials, both randomized and nonrandomized, with results that consistently support a specific action (e.g., assessment, intervention or treatment).
C. Evidence from observational studies (e.g., correlational, descriptive studies) or controlled trials with inconsistent results.
D. Evidence from expert opinion or multiple case reports.

METHODS USED TO ANALYZE THE EVIDENCE

Review of Published Meta-Analyses
Systematic Review

DESCRIPTION OF THE METHODS USED TO ANALYZE THE EVIDENCE

Not stated

METHODS USED TO FORMULATE THE RECOMMENDATIONS

Not stated

RATING SCHEME FOR THE STRENGTH OF THE RECOMMENDATIONS

Not applicable

COST ANALYSIS

A formal cost analysis was not performed and published cost analyses were not reviewed.

METHOD OF GUIDELINE VALIDATION

External Peer Review
Internal Peer Review

DESCRIPTION OF METHOD OF GUIDELINE VALIDATION

Reviewed by series editor Marita G. Titler, PhD, RN, FAAN and expert reviewers David R. Austin, PhD, Professor, Department of Recreation and Park Administration, Indiana University, Bloomington, Indiana, and Judith E. Voelkl, PhD, CTRS, Associate Professor, Department of Parks, Recreation and Tourism Management, Clemson University, Clemson, South Carolina

RECOMMENDATIONS

MAJOR RECOMMENDATIONS

The grades of evidence (A-D) are defined at the end of the Major Recommendations.

Assessment Criteria

The Wheelchair Biking program is indicated for older adults with mild to moderate depression, with or without cognitive impairments. Clients should be selected for screening based on a diagnosis or history of depression, use of an antidepressant medication without a depression diagnosis, or signs and symptoms of depression noticed by staff, family or friends (Fitzsimmons, 2001. Evidence Grade = B). Frequently depression in the elderly has atypical presentation and thus is not diagnosed and therefore not treated and not in their medical records (Devanand et al., 1994). Signs of depression include sadness, weepiness, apathy, passivity, sleep disturbance, agitation, anxiety, decreased socialization, decreased verbalization, weight loss, mobility problems and frequent unspecific somatic complaints. (U.S. Dept. of Health, 1999) (For further information, see the Evidence-Based Protocol: Detection of Depression in the Cognitively Intact Older Adult, by Piven, 1998). Depression is common in the elderly, but unless a mood assessment is performed, the diagnosis may be missed. Although mood assessment can be performed upon admission to a residential setting home, many patients may need time to adjust to their new surroundings. Allow one to two weeks to adjust to the new environment before screening for depression. Several formal assessment tools (listed below) are available to assess patients with depression. These tools and their descriptions can be found in Appendix A of the original guideline document.

- Geriatric Depression Scale - Short Form (Sheikh & Yesavage, 1986)
- Geriatric Depression Scale - Long Form (Yesavage et al., 1983)
- Cornell Scale for Depression in Dementia (Alexopoulos et al., 1988)

Assessment Tools

Keep in mind there are few older adults that cannot participate in the Wheelchair Biking program. After identifying residents with depression the next step is to determine if the resident is able to safely participate (See Appendix B in the guideline: Wheelchair Biking Resident Selection Checklist) and if the resident has

an interest in participating. As it is difficult to describe the wheelchair bike, it is best to show the bike to the resident and ask them if they would like to take a ride on it sometime. If they are uncertain, ask them if they would like to watch others riding. Residents that CAN participate include those with and without dementia, those requiring assistance to transfer or a Hoyer lift to transfer, individuals with urinary drainage devices, portable oxygen and portable tube feedings (Fitzsimmons, 2001. Evidence Grade = B). Residents that CANNOT participate are individuals who have postural or other conditions, such as a decubitus ulcer, that prohibit them from sitting upright, those with extreme, unpredictable behaviors, and those with acute illnesses. If you are uncertain, ask the patient´s physician or nurse practitioner.

A sample physician order for the therapy would be:
Recreational Therapy: Wheelchair biking every day X 2 weeks for depressive symptoms

Description of the Practice

This program uses a specialized piece of therapy equipment called the Duet wheelchair bike. The Duet™ wheelchair bike is an innovative intervention as it can be used with the majority of nursing home residents (see Figure 1 in the guideline document). This psychosocial treatment links two familiar items--a wheelchair and a bike, using the Duet™ wheelchair bicycle. The bike consists of a rugged wheelchair which attaches to a half a bicycle, and which is unusable on its own. The specially designed chair, orthopedically shaped from fiberglass, reinforced plastic, has padding and adjustable foot and headrest. When fixed to the cycle the chair tilts back, lifting the small front guide wheels off the floor. This gives a relaxed, stable seating position and makes conversation between resident and rider easier. The chair has good suspension and light handling, and it's off road tires are excellent on gravel and dirt tracks. There are twin drum brakes on the chair's wheel, and a back-pedal brake on the cycle wheel. Standard on the bike is a three-speed hub gear allowing easier pedaling up inclines. The bike comes with many additional safety features including a chest harness seat belt and wheel-spoke covers. This system enables residents, at all levels of functioning, especially those individuals with severe disabilities, to ride in the wheelchair while the therapist pedals and steers from the back. This provides the older adult with an opportunity to enjoy extended mobility and a sense of freedom, an opportunity to be outdoors, to feel the wind and the sun, to socialize with others, and to bring back familiar childhood memories. The therapy biking program combines the approaches of small group socialization, reminiscing, and exercise therapies without the required mobility or advanced cognitive skills thereby making this treatment available to a wide range of older adults.

The cost of a Duet™ wheelchair bike and helmets is under $4000. The Duet™ is very well built and should last indefinitely and has the advantage that it can be used by persons other than facility staff members. It is an ideal intervention for family members to use as they are often at a loss of what to do while visiting. Facility staff members who use the bike enjoy riding residents and have commented that it makes the residents less depressed (Fitzsimmons, 2001). It provides the staff members with something meaningful and "fun" to do with their residents besides the daily bathing, dressing, feeding and toileting.

Steps to Take to Set Up a Wheelchair Biking Program

Step 1: Determine the feasibility of a biking program. Is there safe space to ride outdoors? Minor hills are not a problem but a paved area with little traffic is important. A large facility with wide halls and good turn-around spots can also use the bike indoors. If there is an interest in this program by facility management, staff, residents and family members, all disciplines, family members and even volunteers can be taught how to assist with the program.

Step 2: Determine who will be responsible for training the riders, as no one should ride a resident without understanding all functions of the bike. Make certain that everyone who is to ride residents is properly trained and rides another staff member **before** riding any residents (see Appendix C: **Wheelchair Bike Staff and Volunteer Training**, and Appendix D: **Wheelchair Biking Training Record** in the guideline document). Although the bike is easy to pedal, the steering is different from a conventional bicycle and takes some practice.

Step 3: Determine a safe bike route or course. This will be specific to your location but try to include areas of interest on your campus such as a pond or gardens. Consider having walkie-talkies available, one for the bike rider and one to remain with a staff member in the facility. Or, use a cellular telephone. Have sunglasses available for residents on bright days. Other items you may want to have is a squeeze-type horn for your resident to use, bread to throw to fish, nuts for the squirrels along the way, and binoculars. Taking pictures of the resident on the bike allows residents to show their friends and family when they visit.

Step 4: Other things to consider include: 1) set up a designated space to house the bike when not in use, and 2) select a maintenance crew for minor repairs, and tire inflation (They also make wonderful bike peddlers).

Step 5: Ordering the equipment: The Duet™ Tandem Wheelchair Bicycle is made in Germany and distributed in the United States by:

Frank Mobility Systems, Inc.
1003 International Drive
Oakdale, PA 15071
Toll Free (888) 426-8581
Phone (724) 695-7822
Fax (724) 695-3710
Email info@frankmobility.com
http://www.frankmobility.com

The basic model bike, called the economy Duet™, has 3 speeds and is adequate for most settings. Optional equipment recommendations are based on past equipment used in research with older adults and is recommended for safety purposes (Benson & Tatham, 2002; Fitzsimmons, 2001; Fitzsimmons & Buettner, 2002). Contact authors for assistance and advise on purchasing the Duet. The recommended optional equipment includes:

- An adjustable headrest: which is helpful for patients with poor neck control.

- Swing away brackets for the footrest: making transferring on and off easier and safer.
- "H" style harness: which is helpful for patients who are post-stroke or have difficulty maintaining an upright position. The bike does come with a seatbelt that is adequate for most riders.
- Wheelchair spoke protectors: these prevent hands and fingers from injury from the wheelchair spokes when riding.

The Program

Optimal effectiveness is achieved by implementing the intervention for a two-week period, five days per week (Fitzsimmons, 2001; Fitzsimmons & Buettner, 2002). As it is not feasible to provide recreational therapy indefinitely to an individual resident, this two week intensive is followed by a maintenance period where the patient rides 2 days per week and encouraged to attend other facility activities the remaining days of the week. This one-hour program is designed for groups of three to five participants for each session and has two components (see Appendix E: **Therapy Biking Protocol for Older Adults in Residential Settings** in the guideline document). The residents should be grouped based on similar cognitive functioning levels with consideration given to the personalities of the individual residents. For example, you may not want to place two residents in the same group that have a known dislike for each other. Consideration must also be given to the physical functioning levels of the participants. For example, you may not wish to include, in the same group, four residents that require lifting devices to transfer to the wheelchair bike, unless you have the staff end equipment available during your program time to complete all of the transfers. Once the group is assembled the first rider is assisted into the wheelchair portion of the bike. The rest of the group sits with a second staff member and discusses biking and other activities from the past. One-by-one each rider is encouraged to put his or her safety helmet and H-harness on independently and take a ride. When he or she returns to the group a discussion is held about things seen during the ride. Ask the participant how he or she enjoyed his or her ride and record it on their ride record (see Appendix F: **Wheelchair Biking Ride Record** in the guideline document). This continues until all participants have had the opportunity to ride. This daily intervention may be best viewed as an intense two-week therapy period with the objective of initiating a change in symptoms of depression. It is then followed up with a maintenance biking therapy period of eight to ten weeks, with rides given two times a week in addition to encouragement and opportunity to participate in routine facility activities (Buettner & Fitzsimmons, 2002). During the maintenance period, staff informs residents of other facility activities that are available and assists, or arranges assistance, to transport the resident to the facility activities that interest the resident. These activities are unique to each facility but may include music, entertainment, arts & crafts, intergenerational programs, pet visits, church and other on-going facility activities. Staff may also consider using the wheelchair bike to transport residents to these activities.

Using the Duet™ Wheelchair Bicycle

The Duet™ bike has two parts to it: the wheelchair, which is usable on its own and the bike portion, which is unusable on its own. The wheelchair, by itself, may be brought on a unit or into a residents´ room for loading (See steps 4, 5, 6 listed

below). Or residents may be brought outdoor and loaded onto the chair while it is attached to the bike. The two pieces of the wheelchair bike clip together with a u-bar, shackle and locking clip. Always check the tires of the bike and wheelchair, refill when they feel soft according the manufacturer recommendation. Caution should be taken on wet, slanting, uneven and slippery road surfaces.

Loading Riders:

1. Lock the front brakes of the wheelchair by pulling up on the parking brake bar on the back of the wheelchair and pushing the bar into the parking brake clip.
2. Align the back of the bike frame with the wheelchair and slip the u-bar into the catch on the back of the wheelchair.
3. Push the shackle forward into the catch. All four wheels of the wheelchair are still on the ground and you will want to seat your rider before proceeding (see Figure 2 in the guideline document).
4. Unclip one side of the footrest by pulling out the slip pin and swing the footrest away prior to loading rider. Keep one side of the footrest attached. If using a lifting device to load a resident on the bike, you do not need to unclip the footrest.
5. Transfer rider to seat making certain s/he is sitting back in the chair. The chair angle may be adjusted using the directions from the manufacturer. This should be done prior to loading your passenger (see Figure 3 in the guideline document).
6. Latch seat belt around rider and adjust to a comfortable tightness. Like with all seat belts they should be worn low around the hips rather than the waist.
7. Adjust the footrest height to a comfortable level by loosening the bolts and sliding the rest up or down. Tool for this adjustment is mounted on the back of the wheelchair. Then swing the footrest back into riding position and replace the slip pin. The headrest may also be raised up or down by loosening the bolts and sliding the headrest up or down. Be sure to tighten all bolts before proceeding.
8. Offer helmet and sunglasses and hat if sunny. If cool outdoors, offer a lap blanket or a sweater.
9. Tell your passenger that s/he will be lifted up a short distance, then push down on shackle locking clip. This will elevate the front wheels of the wheelchair approximately 2" off of the ground.
10. The pedaler should then mount the bike, unlock the front brake, and then start riding.

Unloading riders:

1. Stop bike and lock the parking brakes by pulling up on the brake bar and slipping it into the parking brake clip (see Figure 4 in the guideline document).
2. Inform rider that her/his chair will lower a short distance. Push up on shackle locking clip and the front wheels of the wheelchair will touch the ground (see Figure 4 in the guideline document).
3. If you wish to bring the rider back to the unit in the wheelchair, pull up on the bike frame near the shackle and the two parts will separate. Unlock the parking brake and return the passenger to the unit. Otherwise,
4. Unclip one side of footrest by pulling out the slip pin on one side and swing the footrest to one side.

5. Unfasten seat belt (see Figure 5 in the guideline document).
6. Assist passenger out of wheelchair.

Cautions:

Never load or unload patients without the front brake on.

Never ride the bike without a passenger as this causes a load imbalance and can ruin the wheelchair inner tire tubes. The wheelchair bike is also less stable to ride without a passenger.

Never allow anyone to ride a patient without receiving training first.

Wheelchair bike should be locked when not in use by trained staff to prevent both the theft of the bike and use by untrained personnel.

Definitions

Evidence Grading

A. Evidence from well-designed meta-analysis.
B. Evidence from well-designed controlled trials, both randomized and nonrandomized, with results that consistently support a specific action (e.g., assessment, intervention or treatment).
C. Evidence from observational studies (e.g., correlational, descriptive studies) or controlled trials with inconsistent results.
D. Evidence from expert opinion or multiple case reports.

CLINICAL ALGORITHM(S)

None provided

EVIDENCE SUPPORTING THE RECOMMENDATIONS

REFERENCES SUPPORTING THE RECOMMENDATIONS

References open in a new window

TYPE OF EVIDENCE SUPPORTING THE RECOMMENDATIONS

The type of supporting evidence is identified and graded for selected recommendation (see "Major Recommendations").

BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS

POTENTIAL BENEFITS

The introduction of this powerful intervention, wheelchair biking, provides a positive experience and may interrupt the cycle of depression. The protocol may

reduce depressive mood in older adults and may provide a complementary or alternative treatment to medications.

Subgroups Most Likely to Benefit:

Individuals/patients at risk for depression:

- Medication Usage: Some antihypertensive, hormonal and neuroleptic agents, Carbidopa/levodopa, Beta blockers, Clonidine, Benzodiazepines, Barbiturates, Anticonvulsants, Histamine-2 blockers, Calcium channel blockers, Thiazide diuretics, Digoxin, and narcotics Polypharmacy, defined as three or more medications per day, was also found to place patients at high risk
- Medical Causes:
    - Chronic illness: Late-life mental disorders are often detected in association with somatic illness. The prevalence of clinically significant depression in later life is estimated to be highest, approximately 25 percent, among those with chronic illness, especially with ischemic heart disease, stroke, cancer, chronic lung disease, arthritis, Alzheimer´s disease, and Parkinson's disease.
    - Cardiovascular accidents: Six prospective evaluations of depressive symptoms/syndromes using various criteria revealed the prevalence of major depressive disorder to be between 10 and 27 percent in post-stroke patients, with an additional 15 to 40 percent showing less severe forms of illness within 2 months of the stroke.
    - Dementia: Approximately 30 to 40 percent of Alzheimer's disease patients demonstrate formal depressive mood syndromes and/or psychotic symptoms sometime during their illness.
    - Parkinson's disease: Approximately 50 percent of Parkinson's patients with dementing symptoms have major depressive disorder sometime during the course of the illness.
    - Diabetes: Numerous recent studies that have estimated the prevalence of depression in treated samples of diabetic adults suggest that major depressive syndrome is approximately three times more common in patients with diabetes than in the general population.
    - Coronary Artery Disease: The relationship between depression and increased morbidity and mortality is well documented in both post-myocardial infarction patients and in coronary artery disease patients without myocardial infarction.
    - Persistent insomnia, occurring in 5 to 10 percent of older adults, is a risk factor for the subsequent onset of new cases of major depression in older persons.
    - Impaired Vision: The rate of depression among nursing home residents with visual impairments exceeds 45%.
    - Hearing Impairment: Older adults with hearing impairments have significantly more depressive symptoms than normal hearing older adults.
    - Posttraumatic Stress Disorder: PTSD studies have found high levels of comorbid major depressive disorders.
    - Pain: Correlates with depression and more severe if the depression is unrecognized.
    - Urinary Incontinence: There is an association between depression and patients with urinary incontinence.

- Psychological Conditions:
    - Risk factors for late-onset depression, based on results of prospective studies, include educational attainment less than high school, impaired physical functioning status, and heavy alcohol consumption.
    - Social Isolation: Social isolation correlates with depression among community dwelling elders and for nursing home residents lack of social relationships with other residents is a strong predictor of depression.
    - Bereavement: At least 10 to 20 percent of widows and widowers develop clinically significant depression during the first year of bereavement.
    - Losses: Correlations have been found between depression and a variety of losses including loss of family home, friends, social activities, volunteering, financial security, and marital harmony.

POTENTIAL HARMS

As with any outdoor activity getting caught in bad weather, too much sun or heat exposure, can cause dehydration or heat stroke.

Biking specific: flat tire. Potential of falling from bike has similar, yet slightly greater risks, than falling from a wheelerchair, as speed and terrain may increase this possibility. Untrained pedalers pose greater risk of falling from a bike. This should not occur if guidelines are followed.

Other risks: injury during transfer into wheelchair portion of bike.

Subgroups Most Likely to be Harmed:

Individuals who cannot participate in the wheelchair biking program:

- those with postural conditions, such as decubitus ulcer, that prevent them from sitting upright
- those with extreme unpredictable behavior
- those with acute illness

QUALIFYING STATEMENTS

QUALIFYING STATEMENTS

This evidence-based practice protocol is a general guideline. Patient care continues to require individualization based on patient needs and requests.

IMPLEMENTATION OF THE GUIDELINE

DESCRIPTION OF IMPLEMENTATION STRATEGY

Evaluation of Process and Outcomes Indicators

Process Indicators

Process indicators are those interpersonal and environmental factors that can facilitate the use of a protocol.

One process factor that can be assessed with a sample of staff is knowledge about Wheelchair Biking for Depression. The **Wheelchair Biking for Depression Knowledge Assessment Test** (see Appendix G in the guideline document) should be assessed before and following the education of staff regarding use of this protocol.

The same sample of staff for whom the Knowledge Assessment test was given should also be given the **Process Evaluation Monitor** (see Appendix H in the guideline document) approximately one month following his/her use of the protocol. The purpose of this monitor is to determine his/her understanding of the protocol and to assess the support for carrying out the protocol.

Outcome Indicators

Outcome indicators are those expected to change or improve from consistent use of the protocol. The major outcome indicators that should be monitored over time are:

- Decrease in depressive symptoms: This will be individualized and specific for each patient and may include:
    - Sadness/weepiness
    - Loss of interest/apathy
    - Decreased socialization/verbalization
    - Weight gain or loss
    - Low energy/fatigue
    - Unspecific complaints

For this protocol, direct observation, patient record audit or standardized formal assessment instruments (see below) may be used to evaluate whether depression has decreased:

Geriatric Depression Scale - Short Form (see Appendix A.1 in the guideline document).
Geriatric Depression Scale - Long Form (see Appendix A.2 in the guideline document).
Cornell Scale for Depression in Dementia - (see Appendix A.3 in the guideline document).

Activity participation may be obtained from activity records. It is important to use the same method of evaluating depression before and after implementing the Wheelchair Biking intervention. It is recommended that post testing with an assessment instrument be performed after 2 weeks of intervention and monthly thereafter.

The Wheelchair Biking Outcomes monitor (see Appendix I in the guideline document) is to be used for monitoring and evaluating the usefulness of the Wheelchair Biking protocol in improving outcomes of patients with depression.

Please adapt this outcome monitor to your organization or unit and add outcomes you believe are important.

INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT CATEGORIES

IOM CARE NEED

Getting Better
Living with Illness
Staying Healthy

IOM DOMAIN

Effectiveness
Patient-centeredness
Safety

IDENTIFYING INFORMATION AND AVAILABILITY

BIBLIOGRAPHIC SOURCE(S)

Wheelchair biking for the treatment of depression. Iowa City (IA): University of Iowa Gerontological Nursing Interventions Research Center, Research Dissemination Core; 2003 Feb. 53 p. [86 references]

ADAPTATION

Not applicable: The guideline was not adapted from another source.

DATE RELEASED

2003 Feb

GUIDELINE DEVELOPER(S)

University of Iowa Gerontological Nursing Interventions Research Center, Research Translation and Dissemination Core - Academic Institution

SOURCE(S) OF FUNDING

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GUIDELINE COMMITTEE

University of Iowa Gerontological Nursing Interventions Research Center, Research Dissemination Core

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FINANCIAL DISCLOSURES/CONFLICTS OF INTEREST

Not stated

GUIDELINE STATUS

This is the current release of the guideline.

GUIDELINE AVAILABILITY

Electronic copies: Not available at this time.

Print copies: Available from the University of Iowa Gerontological Nursing Interventions Research Center, Research Dissemination Core, 4118 Westlawn, Iowa City, IA 52242. For more information, please see the University of Iowa Gerontological Nursing Interventions Research Center Web site.

AVAILABILITY OF COMPANION DOCUMENTS

None available

PATIENT RESOURCES

None available

NGC STATUS

This NGC summary was completed by ECRI on June 12, 2003. The information was verified by the guideline developer on July 15, 2003.

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