Multifocal Glasses Impair Edge-Contrast Sensitivity and Depth Perception and Increase the Risk of Falls in Older People

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OBJECTIVES: To determine the extent to which multifocal glasses impair contrast sensitivity and depth perception at critical distances required for detecting hazards in the environment and whether multifocal glasses use increases the risk of falls in older people.

DESIGN: One-year prospective cohort study.

SETTING: Falls Laboratory, Prince of Wales Medical Research Institute.

PARTICIPANTS: One hundred fifty-six community-dwelling people aged 63–90.

MEASUREMENTS: Contrast sensitivity, depth perception, accidental falls.

RESULTS: Eighty-seven subjects (55.8%) were regular wearers of multifocal (bifocal, trifocal, or progressive lens) glasses. These subjects performed significantly worse in the distant depth perception and distant edge-contrast sensitivity tests in conditions that forced them to view test stimuli through the lower segments of their glasses. Multifocal glasses wearers were more than twice as likely to fall in the follow-up period than nonmultifocal glasses wearers (odds ratio (OR) = 2.29, 95% confidence interval (CI) = 1.06–4.92), when adjusting for age, poor vision, reduced lower limb sensation and strength, slow reaction time, and increased postural sway. Multifocal glasses wearers were also more likely to fall because of a trip (OR = 2.79, 95% CI = 1.08–7.22), when outside their homes (OR = 2.55, 95% CI = 1.14–5.70), and when walking up or down stairs ($P < .01$). The population attributable risks of regular multifocal glasses use were 35.2% for any falls, 40.9% for falls due to a trip, and 40.9% for falls outside the home.

CONCLUSIONS: The study findings indicate that multifocal glasses impair depth perception and edge-contrast sensitivity at critical distances for detecting obstacles in the environment. Older people may benefit from wearing nonmultifocal glasses when negotiating stairs and in unfamiliar settings outside the home. **J Am Geriatr Soc 50:1760–1766, 2002.**

Key words: accidental falls; contrast sensitivity; depth perception; multifocal glasses

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Presbyopia is a vision condition in which the crystalline lens of the eye loses its flexibility, making focusing on close objects difficult.[1] Presbyopia usually becomes noticeable in the early to mid-forties; by the age of 50, virtually all persons have this condition.[2] To correct for presbyopia, older people are prescribed separate single-lens glasses for distant and near vision or, for convenience, a single pair of multifocal (bifocal, trifocal, or progressive lens) glasses.

Benjamin Franklin invented bifocal glasses, for his own use, in 1784.[3] A year later, he wrote of their advantages, "as I wear my spectacles constantly, I only have to move my eyes up or down as I want to see distinctly far or near, the proper glasses always being ready."[3] There have been many modifications in the years since then, and the usefulness of these lenses has not been doubted. Apart from the convenience of needing only a single pair of glasses, multifocal glasses have definite benefits for specific tasks that require changes in focal length, including everyday tasks such as driving, shopping, and cooking.

Nevertheless, multifocal glasses have disadvantages. For bifocal glasses, these include optical defects such as prismatic jump at the top of the reading segment that causes an apparent displacement of fixed objects.[2,4] The lower lenses of all types of multifocal glasses (designed for reading at a focal distance of approximately 0.60 meters) also blur distant objects in the lower visual field; this factor, in particular, can represent a significant problem for older people.[4,5]

Falls are common in older age,[6] and, for those who fall, the consequences can be severe.[7] There are many anecdotal reports that multifocal glasses constitute a "danger" for older people[5] and people with disabilities that affect gait.[8] We hypothesize that viewing the environment through the lower lenses of multifocal glasses adversely affects the important visual capabilities for detecting environmental hazards, which predisposes older people to falls, particularly in challenging

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or unfamiliar environments. In this study, this issue is examined by assessing the effect of multifocal glasses use on distant edge-contrast sensitivity, depth perception, and falls incidence in a large cohort of community-dwelling people.

METHODS

Subjects

The study sample comprised 57 men and 99 women aged 63–90 (mean ± standard deviation = 76.5 ± 5.1).[9] Subjects who were living independently in the community (n = 77) were randomly selected from electoral rolls for the statistical division of Eastern Sydney, Australia, and asked to join the study. The remainder (n = 79) were drawn from a retirement village within the study area, in which all subjects were invited to participate in the study. The main exclusion criterion was a health or mobility problem that precluded them leaving their homes to attend the balance clinic. Subjects with Short Portable Mental Status Questionnaire (SPMSQ) scores[10] of 7 or less were also excluded from the falls ascertainment follow-up phase because cognitive impairment can lead to underreporting of falls.

The participation rate of eligible subjects for the electoral roll and retirement village samples were 47% and 43%, respectively. No data were collected to assess response bias in this study, although previous research using the same strategy to recruit community-dwelling subjects found no significant differences between the study sample and the reference population from which it was drawn with respect to marital status and percentage in the workforce.[11] Nevertheless, it was evident in the previous study that people aged 85 and older were underrepresented, which was most likely due to higher proportions of people in this age group in the reference population living in institutional care.[11] Within the retirement village population, related findings from a study examining the effects of exercise on falls risk factors in this population group[12] indicate that those with higher levels of illness and frailty were less likely to participate in the trial. Thus, it is likely that findings relate only to more-able older people living in community and retirement village settings.

Eighty-seven subjects (55.8%) were regular wearers of multifocal glasses; that is, they usually wore them for all activities of daily living (ADLs), including walking outside the home. Of these, 76 wore bifocal glasses and 11 wore trifocal or progressive lens glasses. All the regular multifocal glasses wearers had been wearing multifocal glasses for at least 1 year (mean 19.7 ± 10.8, range 1–56). Of the remaining 69 subjects (regular nonwearers), 67 (97.1%), owned one or more pairs of glasses; 31 owned reading glasses only, 16 owned bifocal glasses, nine owned distance and reading glasses, eight owned distance glasses only, and three owned multifocal glasses. The 19 subjects with bifocal and multifocal glasses restricted their use of these glasses to reading and activities that required changes in focal length, such as driving. The regular multifocal glasses wearers were significantly older than nonwearers (mean age 77.3 ± 5.5 and 75.6 ± 4.6, respectively ($t_{154} = 2.0$, $P < .05$)).

The prevalence of medical conditions, adequate eye care, participation in physical activity, walking aid use and mobility, and ADL limitations for the subjects was determined by self-report. The interviewer transcribed the names of currently used medications from the container labels directly to the coding form. Medications were then classified according to the medical information management systems therapeutic class index.[13] As indicated in Table 1, there were no significant differences between the multifocal glasses wearers and nonwearers for any of the above measures (Table 1). There were also no significant group differences in any of these test measures or in the proportion of community-dwelling or retirement village dwellers who regularly wore multifocal glasses (57.0% and 54.5%, respectively; $\chi^2 = 0.09$, $df = 1$, $P = .761$). Further descriptions of glasses use, eye care, and medical conditions have been reported previously.[9] The Ethics Committee at the University of New South Wales gave approval for this study, and informed consent was obtained from all subjects.

The Visual Tests

Edge-Contrast Sensitivity

An enlarged version of the Melbourne Edge Test[14] was used to test subjects' edge-contrast sensitivity for targets positioned at ground level and 135 cm in front of them. This distance approximates two steps, the critical distance for detecting environmental hazards when walking.[15] The test stimuli consisted of 24 octagonal test plates (300 mm in width) with edges of reducing contrast (measured in decibels (dB) where: dB = –10 log contrast) and of variable orientation. The lowest contrast plate correctly identified (highest decibel score) was the subject's edge-contrast sensitivity.

Subjects performed this test wearing the glasses (if applicable) they usually wore when walking outside their homes. Those who usually wore multifocal glasses performed the test twice. Initially, they stood with their chins resting comfortably on a chin rest. This prevented them from moving their heads to look down, so that the test plate was only visible through the lower (reading) segments of their glasses (verified in every case). The test was then repeated without the chin rest so that subjects could look down at the test plates through the upper (distance) segments of their glasses.

Depth Perception

Depth perception was measured using a Howard-Dohlman depth perception apparatus (Balance Systems Inc., Sydney, Australia).[16] This test required subjects to align two vertical rods (0.8 cm diameter) in depth from a distance of 3 meters. Errors in aligning the rods were measured in centimeters. As with the contrast sensitivity test, subjects performed this test wearing the glasses they usually wore when walking outside their homes. Initially, they viewed the rods through the upper (distance) segments of their glasses. They then viewed them again through the lower (reading) segments of their glasses. This was achieved by having the subjects place their chins on a chin rest that forced the head position up slightly. (Only the final 48 of those who usually wore multifocal glasses (55.2%) performed the test twice, because this paradigm was conceived shortly after the commencement of the study, but grouped *t* test analysis revealed no significant differences between the 48 who completed the dual testing and the 39 who did not for corrected visual acuity, corrected distance depth perception, proprioception, lower limb strength, reaction time, or body sway).

Table 1. Visual, Health, and Lifestyle Characteristics of Multifocal Glasses Wearers (n = 87), Nonwearers (n = 69), and Total Sample (n = 156)

Condition	Wearers	Nonwearers	Total
	n (%)		
Visual conditions			
History of cataracts	40 (46.0)	29 (42.0)	69 (44.2)
Cataract surgery	26 (29.9)	24 (34.8)	50 (32.1)
Glaucoma	14 (16.1)	7 (10.1)	21 (13.5)
Macular degeneration	3 (3.4)	2 (2.9)	5 (3.2)
Eye care within 12 months	70 (80.5)	51 (73.9)	121 (77.6)
New glasses within 24 months	56 (65.1)	47 (70.1)	103 (66.0)
Other medical conditions			
Stroke	4 (4.6)	8 (11.6)	12 (7.7)
Heart disease	16 (18.4)	14 (20.3)	30 (19.2)
High blood pressure	36 (41.4)	21 (30.4)	57 (36.5)
Lung problems	12 (13.8)	10 (14.5)	22 (14.1)
Diabetes mellitus	4 (4.6)	4 (5.8)	8 (5.1)
Medication use			
≥4 medications	44 (54.3)	26 (41.9)	70 (44.9)
Cardiovascular system medications	61 (70.0)	41 (59.4)	102 (65.4)
Psychoactive medications	21 (24.1)	16 (23.2)	37 (23.7)
Musculoskeletal system medications	11 (12.6)	6 (8.7)	17 (10.9)
Physical activity			
Undertook planned walks ≥1 times/week	68 (78.2)	52 (75.4)	120 (76.9)
Walked ≥3 hours/week	31 (35.6)	30 (43.5)	61 (39.1)
≥3 hours planned exercise/week	45 (51.7)	36 (52.2)	81 (51.9)
Mobility and activities of daily living limitations			
Used a walking aid	14 (16.1)	11 (15.9)	25 (16.0)
Difficulty shopping	8 (9.2)	7 (10.1)	15 (9.6)
Difficulty bathing or toileting	0 (0)	0 (0)	0 (0)
Difficulty with clothes washing or room cleaning	9 (10.3)	5 (7.2)	14 (9.0)
Difficulty cooking	2 (2.3)	3 (4.3)	5 (3.2)

Postural Control Assessments

In addition to the contrast sensitivity and depth perception tests, subjects underwent assessments of visual acuity, proprioception, muscle strength, reaction time, and postural sway.[17,18] Visual acuity was assessed using a logMAR chart. Proprioception was measured using a lower limb-matching task. Errors were recorded using a protractor inscribed on a vertical clear acrylic sheet (60 cm × 60 cm × 1 cm) placed between the legs. Testing of the knee extensor strength was performed using a strap incorporating a load cell, which was connected to an amplifier, with the output recorded on a digital display. Strength was measured with the subject sitting on a tall chair with a strap around the leg 10 cm above the ankle joint. The angles of the hip and knee joints were 90°. In three trials, the subject attempted to push against the strap assembly with maximal force for 2 to 3 seconds, and the greatest force (in kg) was recorded. The test of simple reaction time involved a light as the stimulus and a finger-press as the response. Postural sway was measured using a sway-meter that measured displacements of the body at the level of the waist. Testing was performed with subjects standing on a foam rubber mat (40 cm × 40 cm × 7.5 cm thick) with eyes open.

These tests were included because they provide direct measures of the functional capacity of the physiological systems that play important roles in the control of postural stability and take into account "normal" age-related functional declines and any additional impairments resulting from medical conditions (whether diagnosed or not).[17] In this population[9] and in previous studies,[17,18] we have found that these variables preclude medical falls risk factors, such as impaired cognitive status, psychoactive medication use, stroke, and age, from entering discriminant function models and discriminate between fallers and nonfallers with sensitivities and specificities greater than 75%.

Falls

The subjects completed monthly questionnaires on falls incidence for 1 year. The questionnaires sought information on the number, cause, and location of any nonsyncopal falls suffered in each month and the type of glasses worn at the time of each fall.

Statistical Analysis

Paired *t* tests were used to compare the contrast sensitivity and depth test scores for the upper and lower lens viewing conditions for the multifocal lens glasses wearers, and grouped *t* tests were used to contrast the visual acuity and sensorimotor performance scores between the faller and nonfaller groups. Falling rates in the 12-month follow-up period were initially compared with the relative risk statistic. Multiple logistic regression was used to determine whether multifocal glasses use was an independent risk factor for falling, adjusting for age and known physiological risk factors for falls (impaired visual acuity, proprioception, strength, reaction time, and sway). In these analyses, age and the physiological variables were entered as an initial block. Multifocal glasses use was then entered into the model, and change in the amount of variance (r^2) in the falls outcome measures and associated improvement in the model chi-square values were assessed. Finally, population attributable risks were calculated for multifocal glasses use using multivariate odds ratios and proportions of cases exposed.[19] The data were analyzed using SPSS for Windows (SPSS Inc., Chicago, IL).

RESULTS

Effect of Lower Segment Multifocal Lens Viewing on Distant Edge-Contrast Sensitivity and Depth Perception

Figure 1A shows the edge-contrast sensitivity scores for the upper and lower lens viewing conditions for the 87 regular multifocal glasses wearers. Lower lens viewing was significantly worse than upper lens viewing (mean difference –3.0 ± 2.6 dB; $t_{86} = -10.61$, $P < .001$). Related findings from this study population indicate that those in the lowest (worst) quartile for this test (i.e., with scores ≤ 18 dB for best corrected distance vision) had a relative risk of falling of 2.5 (95% confidence interval (CI) = 1.40–4.51).[9] For the multifocal wearers, only 12 (13.8%) had scores of 18 dB or less when viewing the plates through the upper segments of their glasses, but this number increased to 53 (60.9%) when subjects viewed the plates through their lower glasses segments.

As can be seen in Figure 1B, regular multifocal glasses wearers also performed significantly worse in the depth perception test when viewing the rods through the lower segments of their glasses. The mean difference was 2.0 ± 2.3 cm (paired $t = -6.13$, $df = 47$, $P < .001$). Related findings from this study population indicate that subjects who could not align the rods within 2.4 cm, which represents the lowest quartile level for corrected distance vision, had a relative risk of falling of 2.2 (95% CI = 1.21–4.12).[9] Only five of the multifocal glasses wearers (10.4%) recorded scores of 2.4 cm or greater when viewing the rods through the upper segments of their glasses, but, when they viewed the rods through the lower glasses segments, this number increased to 27 (56.5%). Figure 2 shows the mean contrast sensitivity and depth perception test scores for subjects categorized by their usual glasses use. For the multifocal glasses wearers, two scores are given: for the upper and lower glasses segment viewing conditions.

Falls

One hundred forty-eight subjects (94.9%) were available for follow-up—two subjects died, one withdrew from the study, and five had SPMSQ scores of 7 or lower and were excluded from the follow-up phase. Sixty-four subjects (43.2%) reported one or more falls. Of those who fell, 32 fell once only, 21 (14.2%) fell twice, and 11 (7.4%) fell three or more times. The mean age of the fallers and nonfallers was 77.0 ± 5.3 and 75.9 ± 5.0, respectively ($t_{146} = 1.27$, $P = .21$).

Table 2 shows the number and proportion of the multifocal wearers and nonwearers who suffered one or more falls in the follow-up year. Fall types and fall locations are

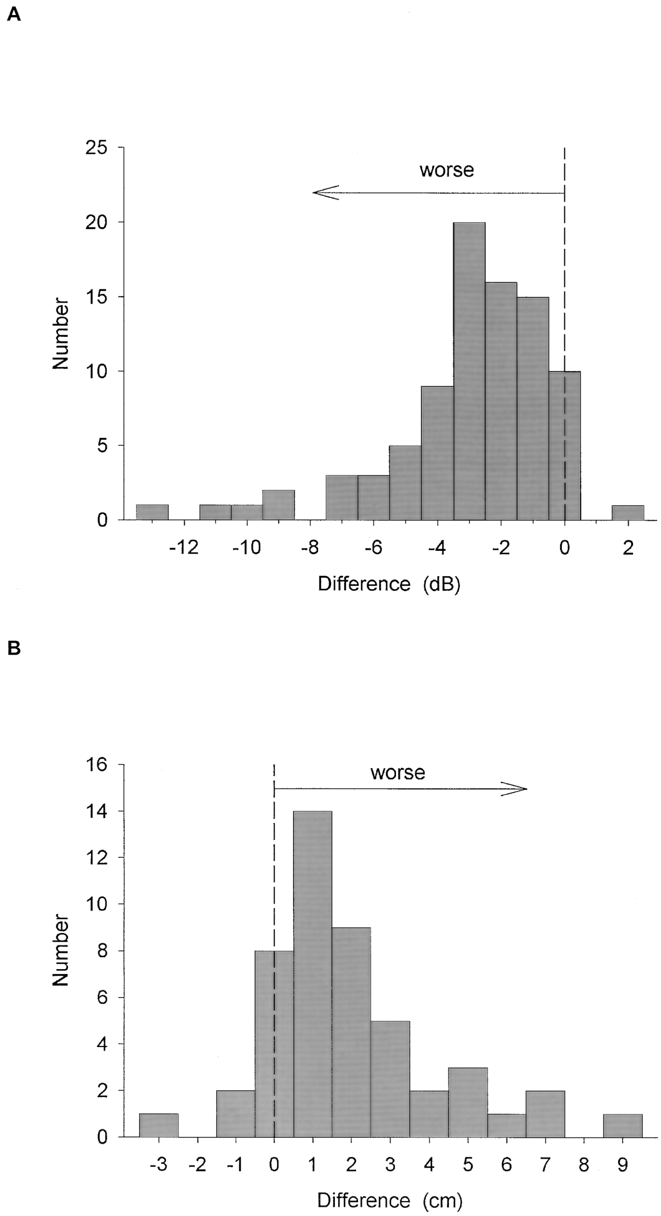

Figure 1. Bars indicate differences between the upper and lower lens depth perception scores (panel A) and edge-contrast sensitivity scores (panel B) for regular multifocal glasses wearers.

also presented. Bivariate analyses revealed a trend indicating that multifocal glasses wearers were at increased risk of falls. With regard to specific causes and situations, the regular multifocal glasses wearers were significantly more likely to fall because of a trip, a trip outside the home, or when walking up or down stairs.

As can be seen in Table 3, the multifocal glasses wearers had significantly better corrected distant visual acuity than the nonmultifocal glasses wearers ($t_{146} = 3.37$, $P < .001$) and performed fractionally better than the nonmultifocal glasses wearers in the tests of reaction time and postural sway. The logistic regression analyses indicated after the inclusion of the physiological measures from our postural control model[14] (visual acuity, lower limb proprioception, quadriceps strength, reaction time, and sway) and age into the model as an initial block, regular multifocal use was

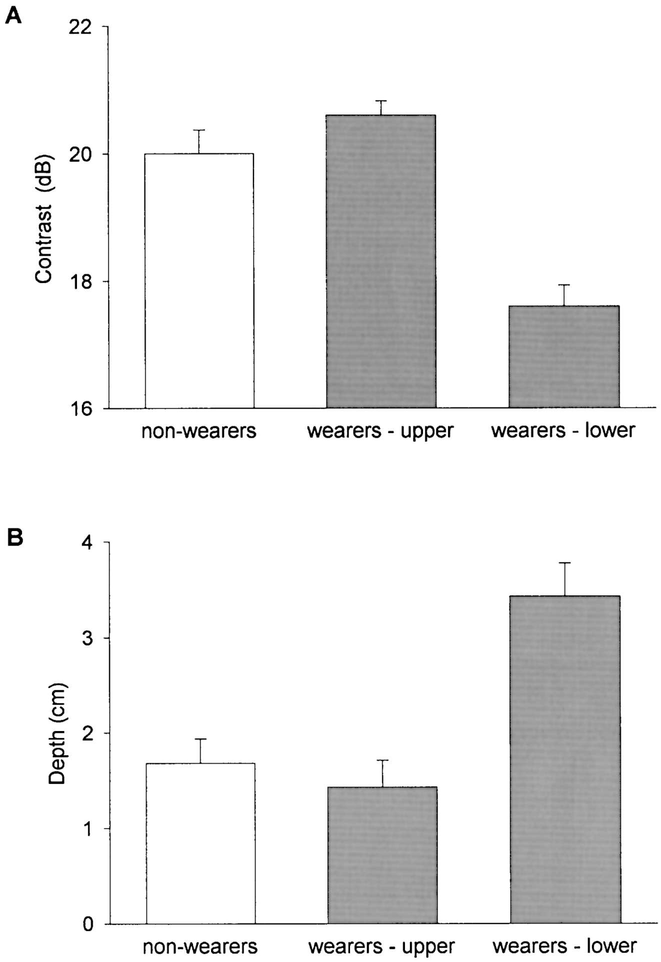

Figure 2. Mean contrast sensitivity (panel A) and depth perception (panel B) test scores for subjects categorized by their usual glasses use. For multifocal glasses wearers, scores are given for the upper and lower glasses segment viewing conditions (error bars indicate 1 standard error).

a significant independent predictor and contributed significantly in explaining further variance in five falls outcome measures. The adjusted odds ratios, r^2 change values, and population attributable risks for these measures—any falls, falls due to a trip, falls due to a trip when outside, falls outside the home, and falls on stairs—are shown in Table 4.

Finally, analyses were undertaken to determine whether multifocal glasses were worn when falls occurred. Table 5 shows that, for any falls, falls due to trips, outside the home, and on stairs, the regular multifocal glasses wearers were wearing their multifocal glasses at the time of most of their falls. No nonregular wearers of multifocal glasses fell while wearing multifocal glasses.

DISCUSSION

Multifocal glasses use is prevalent in older people, as indicated by the high rate of regular use found in the current study. Although the disadvantages of these glasses have been long established,[2,4,7,8] it is commonly assumed that, after an initial adjustment period, multifocal glasses do not pose a significant hazard.[4] For example, Morgan et al. state that "older patients usually can be considered 'expert' bifocal or trifocal wearers in that most of them have been successfully wearing multifocal lenses for many years."[20]

Indeed, multifocal glasses are usually first prescribed for people in their forties and fifties, when the risks of falling[21] and of fall-related fracture[22] are relatively low. However, in the older population, there is an increased prevalence of impaired lower limb sensation, strength, speed, and balance and an increased prevalence of impaired vision.[23,24] Consequently, many older people are less able to execute appropriate corrective balance responses when subjected to a postural threat.[25]

The study findings indicate that the blurring of the lower visual field produced by multifocal glasses impairs contrast sensitivity and depth perception at critical distances required for detecting and discriminating objects in the environment when walking.[15] As a consequence, multifocal glasses appear to increase the risk of a tripping fall by reducing the capacity of older people to perceive obstacles in the environment.[26] This may be particularly the case in unfamiliar settings outside the home where "hazards" such as steps, curbs, uneven ground, and pavement cracks and misalignments are common. In addition, as reported anecdotally, multifocal glasses use was strongly associated with falls that occurred on stairs.

The regular multifocal glasses wearers had better corrected distance vision than the nonregular wearers (when

Table 2. Falls, Fall Types, and Fall Locations for the Multifocal Glasses Wearer and Nonwearer Groups

Falls	Wearers n (%)	Nonwearers n (%)	Relative Risk (95% Confidence Interval)
≥1 fall	40 (48.2)	24 (36.9)	1.31 (0.89–1.92)
Fall causes			
Tripping	24 (28.9)	9 (13.8)	2.09 (1.04–4.18)
Tripping outside	21 (25.3)	7 (10.8)	2.35 (1.06–5.18)
Other*	22 (26.5)	13 (20.0)	1.33 (0.72–2.42)
Fall locations			
Outside the home	33 (39.8)	16 (24.6)	1.62 (0.98–2.67)
Stairs	12 (14.5)	0 (0.0)	($P < .01$)†
Path, curb, or road	17 (20.5)	11 (16.9)	1.21 (0.61–2.40)
Inside the home	15 (18.1)	8 (12.3)	1.47 (0.66–3.25)

*Slipping, loss of balance, legs giving way, dizziness.
†Not calculable due to empty cell.

Table 3. Mean Scores ± Standard Deviations for the Physiological Variables for the Multifocal Glasses Wearers and Nonwearers

Variable	Wearers	Non-wearers
Visual acuity		
(minimum angle resolvable)	1.29 ± 0.53*	2.06 ± 2.92
Proprioception (degrees error)	1.8 ± 1.2	1.9 ± 1.1
Quadriceps strength (kg)	26.9 ± 11.5	28.8 ± 11.8
Reaction time (ms)	276 ± 57	288 ± 58
Postural sway (mm)	169 ± 80	182 ± 108

Note: High scores in the visual acuity, proprioception, reaction time, and sway tests and low scores in the quadriceps strength test indicate impaired performances.
*$P < .01$.

viewing the letter chart stimuli through their upper glasses segments), a factor that should be protective for falls. However, after adjusting for this and other known physiological risk factors for falls and age, the population attributable risks of regular multifocal glasses use were 35.2% for any falls, 40.9% for falls outside the home, 46.7% for falls due to a trip, and 51.2% for falls outside the home due to a trip. It appears that, as indicated in Figure 2, a better estimate of vision for multifocal glasses wearers with regard to falls risk is the ability to detect and discriminate distant objects through their lower glasses segments, rather than through their upper segments.

The high attributable risk of multifocal glasses use for falls suggests that modification of use of multifocal glasses has the potential to reduce falls significantly. The finding that 19 subjects (12.2% of the total sample) who chose not to wear their multifocal glasses when walking outside the home did not have an elevated risk of falls supports this. These subjects restricted their use of multifocal glasses to activities requiring near distance vision or changes in focal depth and did not use them for what they perceived to be a high-risk activity.

There is no doubt that the prevalent use of multifocal glasses by older people is because of their convenience, and it could be anticipated that there would be considerable resistance by older people to suggestions that they obtain separate glasses for distance and reading use. Counselling within the framework of the health belief type model,[27] which provides evidence that multifocal glasses pose a risk of falls, may be helpful in persuading older people to avoid their regular use.

Most prospective studies of falls have made measurements of risk factors at baseline, with no further information obtained about whether the risk factors are present when falls occur in the subsequent follow-up periods. A major strength of this study was that the circumstances of all falls were ascertained, including the eye-wear worn at the time of each fall; this confirmed that regular multifocal glasses wearers were wearing their multifocal glasses when they suffered most of their falls. Nevertheless, it is acknowledged that the study also has certain limitations. The study was not powered to examine differences between multifocal and bifocal glasses or glasses with bifocal lines separating the lenses versus graded lenses. Nonetheless, the lower lenses of multifocal glasses blur distant objects in the lower visual field irrespective of their design, and this is the factor most pertinent to increasing older people's risk of falling. In addition, the refractive power of the glasses lenses was not measured, which might have provided additional information as to why there were variable differences between upper and lower lens performances in the contrast sensitivity and depth perception tests.

It is possible that confounding factors such as differing levels of eye care or activity (and hence exposure to falls) between the wearer and nonwearer groups could account for a significant association between multifocal glasses use and falls, but this seems unlikely, because the adequacy of eye care, the time since the last visit to an eye care specialist, and the time since the most recent change of glasses were similar for the multifocal wearer and nonwearer groups. The groups were also similar with respect to three measures of physical activity: duration of walking per week, number of planned walks per week, and extent of planned exercise per week. All of the wearers were long-term users of multifocal glasses, indicating that early adjustment to multifocal use was not a problem for this group. One potentially confounding factor that could not be addressed in the statistical analysis because of the small number of subjects who wore single lens glasses is the possibility that wearing any glasses when walking outside the home, rather than multifocal glasses per se, could constitute a falls risk factor. This issue would require examination in a large population study.

In summary, the findings indicate that multifocal glasses impair depth perception and edge-contrast sensitivity at critical distances for detecting obstacles in the environment. Because many older persons are at increased risk of falls due to impairments that limit their ability to detect and correct postural disturbances that result from trips, they may benefit

Table 4. Adjusted Odds Ratios (ORs), r^2 Change Values, and Population Attributable Risk (PAR) of Regular Multifocal Glasses Use for Falls Outcome Measures

Fall Type	Adjusted OR (95% Confidence Interval)	Cox r^2 Change	*P*-value*	PAR
≥1 fall	2.29 (1.06–4.92)	0.028	.031	35.2
Fall due to a trip	2.79 (1.08–7.22)	0.030	.028	46.7
Fall outside the home	2.55 (1.14–5.70)	0.035	.023	40.9
Fall outside the home due to a trip	3.15 (1.13–8.77)	0.034	.021	51.2
Fall on stairs	NC	0.107	<.001	100.0

**P*-value = significance of r^2 change when regular multifocal glasses use entered into the regression model.
NC = not calculable due to empty cell.

Table 5. Percentage of Fallers and Falls When Regular Multifocal Glasses Wearers Were Wearing Their Multifocal Glasses

Fall	Fallers n	Fallers Wearing Multifocal Glasses at Time of One or More Falls n (%)	Falls n	Falls when Subject Wearing Multifocal Glasses n (%)
≥1 fall	40	33 (82.5)	78	60 (76.9)
Fall due to a trip	24	19 (79.2)	49	35 (71.4)
Fall outside the home	33	28 (84.8)	70	54 (77.1)
Fall outside the home due to a trip	21	18 (85.7)	45	34 (75.6)
Fall on stairs	12	11 (91.7)	28	27 (96.4)

from wearing single lens glasses when walking. This would appear to be particularly important when walking up or down stairs and in unfamiliar settings outside the home.

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