

Face masks, vision, and fall risk: Look down or slow down?

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Competing interests: We have read and understood the BMJ Group policy on declaration of interests and declare the following interests: None.

Word count: 798 words

Background

Public health experts and international organisations increasingly recommend wearing face masks to help limit the spread of COVID-19.(1) It is therefore important to ensure safe and comfortable mask usage, to maximise adoption and compliance. Formal guidance and associated media coverage has thus far focussed on discomfort and communication issues.(2) However, largely overlooked is the impact of face masks on walking safety and fall-risk. Despite guidance identifying older adults as an ‘at-risk’ group for whom face masks should be recommended, it is this population for whom the effects of masks on walking safety will likely be most pronounced.

Visual obstruction from face masks: reduced walking safety?

Aside from obstructing vision for glasses wearers (by causing spectacles to fog up), face masks invariably block parts of the lower, peripheral visual field. This will be the case for all individuals – those with and without glasses. Visual information from the lower, peripheral field is important for detecting and avoiding nearby hazards, and for placing our steps safely.(3) Wearing a face mask thus reduces the wearer’s opportunity to use this important sensory information during walking, and may therefore increase the chance of tripping or falling.(3,4) To illustrate, there is evidence that multifocal glasses (which similarly obstruct lower visual field, through blurring) can reduce safety when negotiating obstacles and stairs.(5,6)

It might seem logical to therefore advise people to look down at their feet more often while wearing a face mask. Individuals could then acquire the visual information that they would normally obtain through lower peripheral vision when looking ahead. Indeed, such advice is beginning to emerge.(7) While intuitive, we argue that this advice is flawed. To understand why, it is important to consider the two functions for which vision is used when walking.

Vision and walking safety: the downsides of looking down

First, vision is used to detect obstacles and plan a safe walking route,(8) especially in older adults.(9) Looking down more often would thus make it more difficult to plan ahead. Recent research using eye-tracking technology demonstrates that older adults make greater stepping errors when looking down towards their feet, compared to looking ahead and visually previewing potential trip hazards.(10)

Second, maintaining balance requires visual information (particularly from the periphery) to be integrated with other sensory inputs. This is facilitated by minimising head and eye-movements during walking, to provide a stable visual ‘anchor’ that serves as the predominant source of sensory information for regulating balance. Using vision in this manner is particularly important for older adults.(11) Looking down more often is in direct conflict with this strategy. It could even cause significant instability as it requires frequent and large-amplitude movements of the head and eyes,(12) which could lead to a mismatch in visual and vestibular feedback.

In short, recommending to simply “look down” when wearing a face mask may paradoxically disrupt the finely tuned system through which vision is used to maintain walking safety, thus impairing stability. This will affect not only older adults, but any group for whom balance is particularly reliant on vision, such as people with Parkinson’s Disease(13) or diabetic sensory neuropathy.(14)

How can we minimise effects of face masks on walking safety?

We first recommend ensuring a tight fit of the mask around the nose and cheeks. While already recommended to minimise risk of transmission,(1) a tight fit will additionally reduce the visual obstruction caused by the mask and also minimise fogging of spectacles. Future developments may deliver (tailor-made) masks with optimal shape and fit, that combine

comfort with minimal visual field loss. In the meantime, spectacle wearers might borrow anti-fogging strategies from swimmers (a drop of washing-up liquid can do wonders).(15)

Second, rather than recommending at-risk groups to “look down”, we recommend that they “take their time”. Specifically, we advise people to take their time *before* initiating gait, and then slow down *during* walking. This will ensure that individuals have sufficient time to detect future trip hazards, and plan a safe route.(10,16) Slowing down will also reduce the need for frequent, rapid, and large-amplitude head and eye movements while walking. We acknowledge that slower walking speed may have its own disadvantages (e.g., increased gait variability, less intense physical activity). However, given the risks associated with alternative strategies (e.g., looking down more), or with making no adaptations to gait at all, we argue that slowing down represents the strategy of least risk.

To summarise, wearing face masks is an essential requirement in the COVID-19 era, especially for at risk-groups like older adults. Mitigating potential effects on walking safety is important to maximise face mask adoption, and to reduce the likelihood that people will avoid activities for which masks are required. Further research needs to assess the pros and cons of our recommendation (slowing down) and of alternative strategies (e.g. transparent masks) to inform evidence-based public health advice.

Acknowledgments

We would like to thank Neil O’Connell, Jim Richardson, Emma Balfour, and Adam Lewis for their insightful comments on previous drafts. The possible negative effects of face masks on walking safety were brought to our attention by discussions with patients (older adults).

The recommendations provided in this editorial were discussed both with clinicians working in geriatric medicine and patients.

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