



Consumer Factsheet

Effectiveness of Grabrail Orientations during the Sit-to-Stand Transfer

PEER
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If I am an able-bodied older adult, can I benefit from a grabrail by the toilet?

Yes. The way a person rises from sit-to-stand changes with age because of a decrease in muscle strength, joint integrity, and consistency of movement. The sit-to-stand transfer is difficult, and the risk of falls is increased in a wet environment such as the bathroom or toilet. Use of a properly positioned grabrail improves an older person's rise speed, stability, and performance of the sit-to-stand transfer; it can also decrease the likelihood of falls.

Are there regulations that govern grabrails?

Yes, but they apply to public buildings. Australian Standard (AS) 1428.1 and AS 1428.2 contain requirements for grabrail selection and installation. Although applicable to public buildings, they have some relevance for private residences. New construction or renovation of residential buildings must be "adaptable to potentially comply with AS 1428.1, and preferably with 1428.2" (AS 4299, *Adaptable Housing*, Clause 4.4.1). AS 4226, *Guidelines for Design of Dwellings*, Clause 8, recommends that grabrails installed in dwellings comply with AS 1428.1. However these need to be in turn adapted to suit the user that may be smaller and lighter or with specific needs than the average sized person the above-mentioned standards were based upon.

Is a horizontal or vertical grabrail better?

There is not enough scientific evidence to say that one is better than the other. It is clear that the orientation that is better for one individual may not be better for another. The use of a grabrail in either orientation affects the body, but everybody is different. For some users the effects of a particular orientation are positive and make the transfer easier. For other users, the effects may be negative. It is important to provide your occupational therapist with the information he or she needs to determine which orientation is best for you. For existing residential properties, Australian Standards recommend a multi-directional grabrail. The horizontal portion runs **behind** and **beside** the toilet and transitions to an angled or vertical segment 100-150 mm in front of the toilet seat.

There is some research about the effects of various orientations. Several studies have found horizontal grabrails are less effective than vertical or angled grabrails. One reason for this may be that the ability to move the hand up a vertical or angled grabrail can provide support in all stages of the transfer. Several reports also found that the horizontal grabrail does not provide enough support during the final stabilisation stage of the transfer from sit-to-stand. The horizontal grabrail does, however, act as an effective weight bearer; it can support the user's entire forearm during transfer.

What does the occupational therapist need to know about me to determine which grabrail orientation is best for me?

The occupational therapist needs to know if you have one side that has been weakened or paralysed due to a stroke or other impairment, as you would not be able to use a rail placed on that side of the toilet.

The therapist also needs to know the strength and integrity of the major joints you would use in the sit-to-stand transfer, that is in your wrist, elbow, shoulder, hip, knee, and ankle joints, as well as your height and weight. This information is crucial to what type of grabrail is to be used, it's placement, and how much weight it needs to bear.

Where should a grabrail be placed to be most useful?

Orientation to the toilet — most grabrails are placed beside the toilet. It may be possible to place a grabrail in front of the toilet, but the risks and benefits of such placement are not clear. Indeed, a grabrail in front of the toilet could be a hazard in some environments. For existing private dwellings AS 1428.1 recommends that grabrails be placed behind and beside the toilet (AS 4226, Clause 8).

Proximity to the toilet — the grabrail must be close enough so that you can reach it from the toilet and far enough forward of the toilet to stabilise you during the transfer from sit-to-stand. For installation in existing homes, Australian Standards recommend that the grabrail be 450 to 460 mm from the centre of the toilet. The horizontal portion of the rail should extend 100 -150mm past the front edge of the toilet seat.

If the horizontal grabrail transitions to an angled segment, the angled segment should extend at least 700 mm past the end of the horizontal portion. If it transitions to a vertical segment, the top of the vertical portion should be 1400 mm from the floor.

Height — the grabrail must be at a height that will provide you with enough support to gain the required momentum and stability. For existing residential buildings, Australian Standards recommend that the top of the horizontal portion of the grabrail be 800 - 810 mm from the floor. If it transitions to a vertical segment, the top of the vertical portion should be 1400 mm from the floor. These measurements would be need to be adjusted to suit a short or tall person.

Clearance — the grabrail must be mounted far enough from the wall so your fingers can fit between the rail and the wall. It also must be mounted in such a way that your hand can move along the top of the rail without obstruction. For existing residential buildings, the Australian Standards recommend 50 - 60 mm between the grabrail and the adjacent wall or other obstruction and 600 mm above the grabrail. There should be no obstruction to the passage of the hand along the top 270° of the rail.

What characteristics of my toilet/bathroom affect placement of a grabrail?

Stud positioning in walls is important. If there is not a stud where the grabrail is to be secured, other steps must be taken to insure its stability. The grabrail must be able to withstand the force you exert on it during the transfer from sit-to-stand. For existing residential buildings, Australian Standards recommend that grabrails be able to withstand 1100 N of force from any direction. The wall must be close enough to the toilet for you to be able to reach and benefit from the grabrail. The grabrail must also be fixed so that it does not rotate in its fittings. Also, care must be taken to ensure there are no electrical wires or plumbing pipes behind the wall that could be damaged by drilling into the wall.

What diameter should the grabrail be?

For existing residential buildings Australian Standards recommend the outside diameter of the grabrail should be 30 - 45 mm. However, in private homes, the diameter should be matched to the hand size of the person and the impairment.

Refer to the HMinfo consumer factsheet *Selecting diameters for grabrails* for more specifics on diameters.

***This information was correct at time of printing.*