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Forearm support during keyboard and mouse use

Current evidence and implications

Wellnomics® White Paper

Nicola Green, Dip. Physio (Otago), Adv. Cert. Occ. Health Physio. (UK)
Occupational Health Physiotherapist
Wellnomics Limited
www.wellnomics.com
research@wellnomics.com
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Introduction

Recommendations regarding optimal techniques for using a computer keyboard and mouse are generally varied depending on the occupational professional providing the advice, guidance from publications and historical practice.

Conventionally, advice for using the keyboard has been to raise the forearms or 'float' the forearms over the keyboard when typing. This was not based on any sound research evidence. In the last decade there have been several studies investigating the use of forearm support during keyboard and mouse use and the relationship to computer related discomfort. This research provides clear guidelines on best working techniques.

Key Points

- Traditional 'floating' technique for keying not based on research
- Increased research in last decade about forearm support
- Now have clear evidence for recommendations for keyboard and mouse working technique

Forearm support

Forearm support is when a part of the computer user's forearm is directly supported during keyboard and mouse use. The part of the forearm supported may be the lower half of the forearm to the wrist or also include the upper half of the forearm up to the elbow. Forearm support can be provided by the desk top or chair arm rests. Forearm support does not refer to the use of foam or gel keyboard or mouse wrist rests.

Key Points

- Forearm support is when a part of the forearm is supported during keyboard and mouse use on the desktop or chair arm rests
- Does not refer to 'wrist rest' equipment

Muscle activity

Postural load can be measured by muscle activity during work or simulated work tasks. It has been found that supporting the forearms on the desktop reduces the load on the neck/shoulder muscles when using the keyboard and mouse¹. Reduction in muscle activity of these muscles was found² to occur when using either a standard mouse or a trackball with forearm support compared to without support. These general findings have been replicated in several other studies.^{3,4}

Muscle activity of the low back muscles has also been found to be lower with forearm support during mouse use that without support.

Key Point

- Using forearm support during keyboard and mouse use reduces postural load on the neck/shoulder and lower back muscles

Positions of the hand and arm

The effect that forearm support has on the position of the hand and arm during keyboard and mouse use has also been examined. Less wrist upward bend, less wrist movement towards the little finger side and less time spent in this position have been found with forearm support compared to positions of just wrist support and a position of no support. Non-neutral wrist positions have been associated with hand and arm discomfort⁷, so a position of forearm support that reduces non-neutral wrist positions is likely to be beneficial for reducing discomfort.

The addition of a foam 'wrist rest' device in conjunction with forearm support has not been shown to affect wrist posture or muscle activity during keyboard and mouse work. An increased risk of hand/arm discomfort with the use of a 'wrist rest' has also been found when it is associated with the keyboard being close to the desk edge. This means that the addition of 'wrist rest' equipment is not likely to be required when forearm support is available.

Generally, a more forward elbow position is seen with forearm support than without forearm support⁶. Current indications are that this position does not influence discomfort⁷.

Support of the forearms during keyboard and mouse use has been assessed as being an essential component of a good working technique⁸. In addition, people assessed as having a good working technique were shown to have less muscle load in the forearm and in the neck/shoulder during mouse use.

Key Points

- Forearm support reduces non-neutral wrist positions
- Forearm support is an important component of a good working technique

Discomfort and the development of discomfort

Less reports of discomfort have been associated with forearm support compared to no support in laboratory studies⁶ and in interventional field studies.^{9,10}

An increased risk in developing neck and/or shoulder discomfort if the keyboard was placed higher from the floor than elbow height has been found⁷. This implies a position where forearm support is not possible. The same investigation also found that the risk of hand and/or arm discomfort was lower if the 'J' key of the keyboard was placed greater than 120 mm from the desk edge. This implies a position where forearm support is possible on the desk top.

Key Point

- It is less likely that computer-related discomfort will develop if forearm support is used

Conclusions

1. Forearm support is when a part of the forearm is supported during keyboard and mouse use on the desktop or chair arm rests.
2. Forearm support is the most significant factor in optimal positioning for the neck, shoulder, arm and hand during keyboard and mouse use.
3. Using forearm support when using the keyboard and mouse decreases the risk of developing computer related discomfort.
4. Current research refutes the traditional advice of raising the forearms or 'floating' the forearms over the keyboard when typing.
5. Current research advocates the use of forearm support during keyboard and mouse use.

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