Evidence suggests that individuals are not assuming optimal posture while using their computers. Computer users experience lower cervical flexion (forward head posture), head tilt, and scapular protraction and elevation (rounded shoulder).\(^1^{,}2\) Common symptoms of this posture include: pain, numbness, and tingling of the neck, shoulders, upper back, and hands.\(^3\) Further, professional posture experts have studied the effects of visual display terminal tasks on workers' cervical range of motion, neck flexion, and symptoms of pain. Researchers found a decrease in range of motion and increased pain and extension of the right upper trapezius muscle after short amounts of computer work. People over 30 have 2.61 times more likelihood of reporting neck pain during or after computer work.\(^4\) Reports of neck pain related to increased forward bend, more time working, sitting still, mental fatigue, and shortage of workers.

Handheld device users utilize closer working distances.\(^5\) People who sit with the head bent forward, without forward neck and back support, and enter text with one hand versus two, are more likely to experience symptoms related to device use.\(^6\) Gold et al evaluated college student's posture while texting and found that 91% had a flexed neck and 90% a non-neutral wrist position while typing.\(^7\) Neck, shoulder, and thumb pain increased with time spent and frequent internet browsing.\(^8\)

Gillespie et al studied the effects of computer and electronic device use on young individuals musculoskeletal symptoms. Total time spent, overweight status, and spectacle prescriptions were associated with increased reports of musculoskeletal symptoms while using the devices.\(^9\) A survey of 6033 teenagers in Finland revealed that computer work exceeding 2-3 hours per day was significantly related to symptoms of neck pain and 5 hours was the threshold for lower back pain symptoms.\(^9\) Furthermore, increased cognitive demand and psychosocial stress levels contributes to higher frequencies of forward head posture; stress increases muscle activation of the upper body and neck.\(^10\)

In addition to the ergonomic guidelines listed in Table 1, awareness of posture, physical activity, and yoga or meditation practice should be explored for those with musculoskeletal disorders. Proper standing posture aligns the ears above the shoulders and prevents the head from being held forward or to one side. While holding the eyes 2-3 feet in front of the face, the back, neck, and head should be held in a similar fashion while seated.\(^11\) Physical activity promotes healthy posture, promotes flexibility, and reduces psychosocial stress. Individuals with chronic neck, back, and head aches.\(^12\)

Musculoskeletal Consequences

**Frequency of Musculoskeletal Dysfunction with Device Use**

<table>
<thead>
<tr>
<th>Device Parameter</th>
<th>Upper back pain</th>
<th>Hand or arm pain</th>
<th>Neck or shoulder disorder</th>
</tr>
</thead>
<tbody>
<tr>
<td>Desk</td>
<td>62(^%)</td>
<td>39(^%) to 50(^%)</td>
<td>35(^%) to 50(^%)</td>
</tr>
<tr>
<td>Display</td>
<td>42(^%) to 58(^%), 45(^%) to 46(^%), 16(^%) to 17(^%)</td>
<td>28(^%) ((\leq) 18 YO)</td>
<td></td>
</tr>
<tr>
<td>Keyboard</td>
<td>21(^%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time use</td>
<td>50(^%)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Forward neck flexion can lead to**

- Spinal curvature flattening and musculoskeletal disorders
- Spinal degeneration
- Disc herniation or compression
- Elbow and forearm pain
- Nerve and/or muscle damage
- Decreased lung volume capacity
- Gastrointestinal disturbances

**Insufficient arm support can lead to**

- Wrist tendinitis
- De Quervain's tenosynovitis
- Carpal tunnel syndrome
- Medial and lateral epicondylosis

**Recommendations**

In addition to the ergonomic guidelines listed in Table 1, awareness of posture, physical activity, and yoga or meditation practice should be explored for those with musculoskeletal disorders. Proper standing posture aligns the ears above the shoulders and prevents the head from being held forward or to one side. While holding the eyes 2-3 feet in front of the face, the back, neck, and head should be held in a similar fashion while seated. Physical activity promotes healthy posture, promotes flexibility, and reduces psychosocial stress. Individuals with chronic neck, back, and head aches. Meditation significantly reduced perceived stress levels and physical symptoms such as muscle tension, headaches, and dizziness. Meditation improves psychosocial outcomes such as stress levels, psychological symptoms, and sleep. Physical activity and exercise also improve body composition, endurance, flexibility, and overall health. Meditation practice decreased stress, psychosocial symptoms, sleep quality, affect, and physical symptoms. Meditation and physical activity may reduce muscle tension and stress levels.

**References**