Design

Beyond PCs: Armrest Support in a Changing Workplace

New work trends—especially the introduction of tablets, smart phones and other touch-based technologies—present a new set of challenges for worker health and wellbeing.

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Whenever work changes in a fundamental way, it’s important to reexamine the ergonomic support that’s needed. New work trends—especially the introduction of tablets, smart phones and other touch-based technologies—present a new set of challenges for worker health and wellbeing.

Before the introduction of the personal computer into offices in the 1980s, armrests were simple, non-adjustable accessories on executive chairs and conspicuously absent from so-called “secretarial” chairs.

In the 1980s, due to the demands of computer work, the design of chairs evolved to promote longer periods of sitting. That changed in the 1990s when the negative effects of prolonged static sitting and repetitive computer work prompted ergonomic research that elevated the importance of armrests and paved the way for major changes in their design. Especially during the 1990s, chairs evolved from simple sitting devices to ergonomic tools that could adjust to fit the size and shape of bodies and how people worked.

THE EVOLUTION OF ADJUSTABLE ARMRESTS

The initial feature that forayed beyond the fixed armrest was height adjustment. Intended to closely match elbow rest height while seated, an arm height adjustment range of approximately 7-11″ was calculated and still accommodates most of today’s office population.

For nearly two decades, advanced ergonomic chairs have also included armrests that are width and/or pivot adjustable. Width adjustment keeps arms supported close to the body, while pivot action ensures improved support for a range of arm postures. In combination with height adjustment, these adjustments, especially the ability to move arm support inward of the seat edges became critical, as it enables natural support of the arm from the shoulder and wrist from the elbow, regardless of user size.

When properly designed, armrests can relieve loads on the neck, shoulders, arms, backs and buttocks. Studies have also shown that armrests can reduce loads on the spine by about 10% of body weight, and simply using armrests to stand from a seated position reduces force to the hips by 50%.

Depth adjustment, a feature on some armrests, was developed nearly a decade ago in response to observational research. At that time, flat-panel monitors began to replace the deeper VDT (video display terminals) in the office. Computer users instinctively pushed these monitors towards the back of the worksurface, freeing up valuable desk space but also creating interference between the front edge of the armrests and work surfaces or keyboard supports. This prevented maintaining a proper viewing distance to the monitors and resulted in awkward postures, hunching and perching, that contributed to neck and shoulder discomfort. The ability to slide armrests back enabled many users to get closer to their work, helping them maintain healthier postures.

THE NEXT CHAPTER OF ARMREST DESIGN

Recently, ergonomic researchers at Steelcase began a systematic analysis of postures among 2,000 workers in 11 countries on six continents. Among other trends, researchers discovered that new, smaller touch-based devices were changing seated postures and how people go about their work.

The ultimate goal was to use this research to gain insight into how work postures are changing. Viewing posture animations and looking at arm support as part of a system provided the impetus and opportunity to reinvent armrests as a key differentiating feature, since the study amply documented that today’s workers are adopting a greater diversity of postures than existing chair arms were designed to accommodate.

For more than a decade, ergonomists have recognized that vision and reach impact posture, and the use of smaller touch-based devices is no exception. Just as cumulative trauma disorders and repetitive strain injuries (CTDs and RSIs) in the late 80s and 90s were linked to excessive keyboarding and mouse use, complaints of shoulder and neck discomfort are increasing today, and there is strong evidence linking use of handheld devices, both at work and away from work, to those complaints.

In addition to providing proper armrest height, increasing the width adjustment range provides support needed for smaller devices, bringing them to appropriate eye level and avoiding excessive neck flexion. With ample width and pivot adjustments, arms can be supported close to the body in a range of postures and eliminating ulnar deviation which can eliminate or restrict blood flow through the carpal tunnel area, a common cause of workplace pain and injury.

In addition to a much greater range of adjustments, ease of use was also an important consideration. The posture study reinforced findings from previous studies: armrests must be in the right place to deliver ergonomic benefits they also must be simple enough to inspire their use.

Other insights from the Steelcase global posture study contributed to a fundamental rethinking of where to attach the armrests to the chair. An increase in the diversity of worker sizes, both petite and plus-size, means that providing healthy, natural support of the arms would be better facilitated by moving the attachment point of the armrest from the side of the seat to the rear.

This change enables access to a more ample seat without increasing the overall footprint of the chair or compromising fit for petite users. It also enables the height and width adjustments of the armrests to move more fluidly, in arc-like gestures intended to mimic the natural movement of human arms. In addition, armrest attachment at the rear frees up the side edges of the seat, thereby encouraging postural changes. Ergonomists and medical researchers agree that movement while seated contributes to human health and wellbeing. Having the armrests attach in the back of the seat also supports more natural transitions from focused to collaborative work and from desktop to handheld devices.

The relationship between arm and seat reinforces that today's seating solutions must be viewed as a system. All parts are related, much like the human body.

A NEW PARADIGM FOR HIGH PERFORMANCE ARMS.

For more than a decade, Steelcase research has demonstrated that armrests serve an important function in promoting comfort and wellbeing. Those baseline insights are even more relevant today. The many changes that have taken place in the workplace since the 1990s provide ample opportunity to reexamine fundamental ergonomic considerations for adjustable armrests and their important role in helping people work productively, safely and comfortably. The chair arm has evolved along with our technology. Demands on delivering value to the user has drastically changed, leading to a fundamentally different solution for today's work.

REFERENCES

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