

# Obesity in the Office

Obesity, which now afflicts a third of all American adults, has consequences in the workplace. Though normally not seen in epidemic proportions among office workers, it is no longer unusual. Obese workers have special ergonomic needs. Furniture and equipment designed for these workers' biomechanics help offset the difficulties they face in performing routine office tasks.

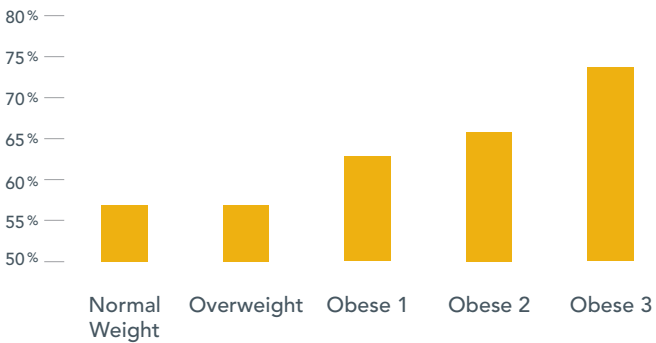
## Problems of the Obese Office Worker

For obese people with office jobs, discomfort is a common complaint. Surveys of call-center employees by Atlas Ergonomics, an ergonomics consulting firm, show that obese workers experience substantially more work-related discomfort than individuals of normal weight. This increases according to the level of obesity. Their exposure to ergonomic risk follows a similar pattern.

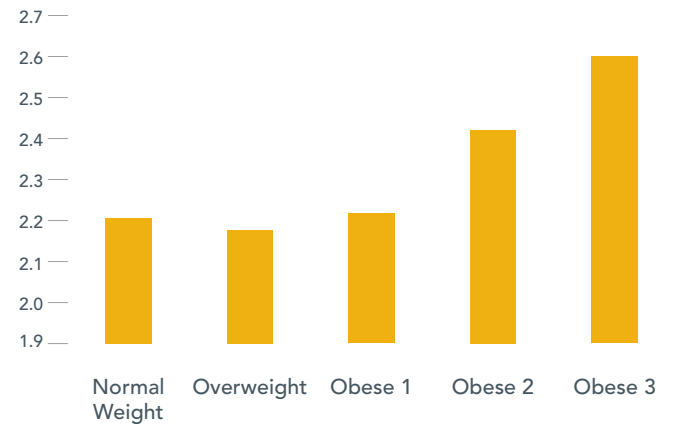
## Categorizing Obesity by Body Mass Index (BMI)

Category	Normal	Over-weight	Obese I	Obese II	Obese III
BMI	18.5-24.9	25.0-29.9	30.0-34.9	35.0-39.9	40.0+

## Percent of Population Experiencing Discomfort

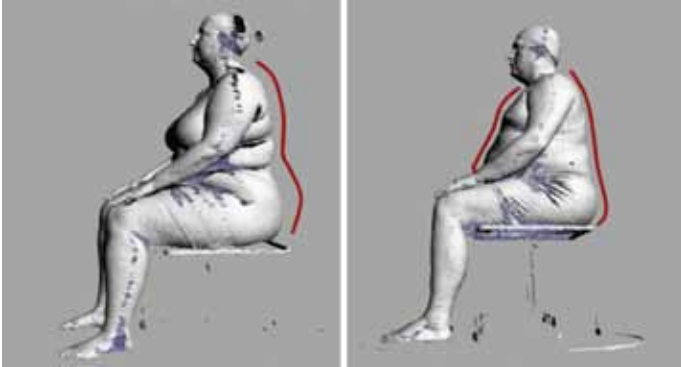


## Average Ergonomic Risk



## High-risk Activities

With obesity, the oversized dimensions of all parts of the physique can obstruct the neutral (safe) postures recommended for office work. Workers' attempts to perform necessary tasks can place them in ergonomically unsound, high-risk positions. These awkward postures exist in the two most common day-to-day office activities: working from the seated position and typing.



Curvature of body profile may cause lumbar support to be too low, or prevent the upper back from making contact with the backrest.

### 1. Sitting: Lower Back

The call-center studies revealed up to a 66% rate of lower-back discomfort in obese workers. Though the causes of this discomfort involve weight-related stress in all daily activities, special attention to this problem as it applies to seated work is useful.

## What's Wrong

Because of excess adipose or fatty tissue in the buttocks and thighs, an obese worker may sit higher in a chair. Contact with the chair's lumbar support may therefore be too low to be effective, and the excess tissue in the buttocks may also put the spine in a forward position that prevents the upper back from making contact with the backrest. Without adequate lumbar and back support the lower spine flattens, causing the shoulders to droop forward and the pelvis to rotate backward so that the tailbone curves down and under the body. The slumped position introduces additional stress in the lower back and pelvis, upper back, shoulders, and neck, already stressed by excess body weight.

As seen in the illustration, there are important differences in the way men and women carry excess weight. For women, enlarged buttocks and thighs can make lumbar supports, backrests, and sometimes armrests out of proper alignment. For men, oversized torsos cause arms to abduct and protruding abdomens prevent contact with the edge of the worksurface, causing strained forward reach.

## Ways To Help

First, an obese individual needs a chair sized and constructed to accommodate greater weight and the larger body dimensions where extra weight is carried. Care should be taken to choose the right chair for the individual, and to adjust it for optimum comfort and support. Chairs are available that offer larger- and wider-than-normal adjustment ranges. The lumbar support should have enough depth (outward curve) and/or adjustability to achieve complete contact with the curve of the lower back when set at the proper height above the seat. Armrests should be capable of being set high enough and wide enough to accommodate abducted arm positions.

## 2. Using the Keyboard: Arms, Wrists, and Hands.

Call-center studies show dramatically more elbow and hand/wrist discomfort in Obese III workers than in normal-weight individuals, and above-average levels of elbow/hand/wrist discomfort in the overweight category as a whole. Examining the mechanics of elbow and hand/wrist problems leads to an understanding of the difficulty obese workers encounter, and the importance of ergonomics in the product design solution.

### What's Wrong

When relaxed, an obese person's shoulders are in an abducted position with upper arms and elbows flared away from the body, rather than perpendicular to the floor. In order to use the keyboard, the individual will pronate (flatten) the hands and angle the wrists outward so that fingers are roughly horizontal to the keys. In this awkward position, the muscles of the forearm are in perpetual stretch, the tendons are squeezed because of the wrist angle (ulnar deviation), and the result over time may be tendon injuries in the elbow and/or wrist.

### Ways To Help

Specially designed keyboards can be effective for chronic postural difficulties of this kind. Split-and-angled keyboards allow the user's forearms to approach the board from their "normal" position (shoulders abducted/elbows out) and their fingers to touch the keys without pronation of the wrists. Keyboard models with a convex (outward-turning)



Awkward wrist posture while typing can lead to elbow and hand/wrist discomfort.

frontal curve help the obese individual by bringing the keyboard closer, reducing the need to reach, and alleviating stretch and strain in the forearms. Padded radius edges on such keyboards eliminate wrist contact with squared-edge worksurfaces, and reduce constriction of tendons if wrists rest on them occasionally. Mouses that can be operated without pronating the wrist are commercially available and may also help. In addition, chair armrests should allow enough adjustment to provide comfortable contact with the forearms in their typical resting position, flared out from the torso. Worksurfaces with cutouts or coves allow obese workers (especially males, whose abdominal body mass is proportionally larger) to get closer to their work and avoid the added strain of reaching.

### Away from the Workstation

The discomfort of the obese worker is not limited to the workstation. Office lobbies and lounges also present problems. Obese people may experience anxiety if they cannot locate a reasonable place to sit. They need seating that will accommodate their size and weight, and they need something for both hands to grip as an assist in getting up. Though enough width may be available on a couch or an armless chair, the obese person will have difficulty without something to grab and push against when rising. Psychologically, wooden furniture or anything that appears light or flimsy will cause apprehension. Solutions to these problems have been developed for lobbies and waiting rooms of healthcare facilities, where the need is most acute, and can be expected to migrate to office environments as awareness of the problem and recognition of the need grow.

### Conclusion

The presence of obese members in the workforce is a natural consequence of a population in which a third of all adults are obese. Employers aware of the ergonomic issues obesity presents and familiar with the design of product solutions that address them will be better prepared to provide furniture and equipment that promote safe, comfortable, and productive working conditions.

## References

*Addressing the Challenge of Obesity and Ergonomics in the Office Environment*, An Atlas Ergonomics White Paper. Atlas Ergonomics, Grandhaven, Michigan, February, 2007.

*Clinical Guidelines on the Identification, Evaluation, and Treatment of Overweight and Obesity in Adults: The Evidence Report*. The National Institutes of Health, U.S. Department of Health & Human Services, Washington, D.C., pp. 139-140. (BMI table).

### For more information

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## Ergonomics at Allsteel

Our ergonomics team studies workers: who they are, the way they work, and what they need to be comfortable and healthy. These insights are built into every product we make. Understanding obesity and the special problems it poses is an important part of designing effective furniture for today's office workforce.

### About the Authors

Dr. Scott Openshaw, CPE, Ph.D., headed the Ergonomics Group at Allsteel. With an academic background in human biology as well as biomedical and industrial engineering, Scott applies human factors and ergonomics principles to product design. Scott has taught rehabilitation engineering at the university level and holds a doctoral degree in industrial engineering from the University of Iowa. He is a member of the Human Factors and Ergonomics Society, the Institute of Industrial Engineers, and is a Certified Professional Ergonomist, granted by the Board of Certification in Professional Ergonomics.

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