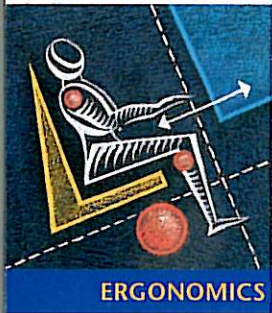


Having a “Ball” at the Office



BIG AND BRIGHT, “exercise” balls look to be packed with fun and promise. It is well-known that their use can strengthen the core, helping to guard against back pain. But these therapeutic balls are finding their way into workplaces and are being used in lieu of office chairs.

The argument is that sitting on a stability (exercise) ball, rather than a proper office chair, will increase trunk (stomach and back) muscle activation. This, in turn, enhances core stability and strength, which presumably will help to reduce low back pain.

That claim, however, is without scientific evidence. Exercise balls were designed as a therapy tool, not as an office chair or a seating option.

Consider the results of a new study, published this year in *Applied Ergonomics*. Ten participants performed one-hour typing tasks: once while sitting on an office chair with armrests, and once while sitting on an exercise ball. Researchers witnessed more trunk (spine) movement while on the ball than while in the chair. Furthermore, sitting on the exercise ball resulted in a reduction in the height of the subject (spinal shrinkage), which may indicate greater spinal compression during unsupported sitting on the ball.

With regard to physical loading, the advantages while sitting on an exercise ball may not outweigh the disadvantages.

A matter of comfort

A similar study in *Human Factors*, published in 2006, looked at 14 participants sitting for one hour. Two trials were divided into four tasks at 15-minute intervals: typing, computer-aided design, combined typing/mouse work and reading.

No significant muscle force differences between the two sitting conditions were found, except for higher activation in the left thoracic erector spinae muscles while sitting on the exercise ball. Authors note “prolonged sitting on a stability ball does not greatly alter the manner in which an individual sits, yet it appears to increase the level of discomfort.”

A study published in *Clinical Biomechanics* in 2006 examined eight participants sitting on an exercise ball, a stool and a chair. The contact area of the seat-user interface was found to be greatest on the exercise ball, resulting in more pressure being placed on the

underside of the thighs and buttocks, and prompting participant reports of greater discomfort.

Researchers concluded that prolonged sitting on a dynamic (moving), unstable seat surface does not significantly affect the magnitudes of muscle activation, spine posture, spine loads or overall spine stability. But the greater contact area possibly results in uncomfortable soft-tissue compression.

All in a day's work

Beyond biomechanical factors, there are general occupational health and safety concerns. Exercise balls, being dynamic, can roll out from under a worker when he or she stands up, or reaches for something.

Office chairs and exercise balls are different in other ways as well; the latter having no “ergonomic” features, including adjustable seat height, armrests and lumbar support. These features allow equipment to be adjusted to achieve the best possible fit with a user's dimensions.

Since exercise balls come in standard sizes and their height cannot be adjusted, there is increased pressure on the tissues in the posterior regions of the thigh. This pressure compresses blood and nerve supply which can produce swelling, numbness and discomfort.

As well, having no adjustability or backrest may force a worker to sit improperly. The day may start with workers sitting straight on an exercise ball, but by workday's end, back muscles will have fatigued and the worker will be slouching, causing additional stress on the back.

Material matters

Concerns around exercise balls move beyond look and function; some are about the feel. Padding a seat surface that is too soft (like the exercise ball) will cause the user to sink down and the hips to rotate more.

This rotation forces muscles to work harder to prevent slouching, thereby increasing muscle fatigue. As well, rolling of the pelvis places additional strain on the tailbone and sacroiliac joint, and flattens the lumbar spine. All this can lead to pain in those areas.

While the rehabilitation benefits of exercise balls are significant, especially for short-term use, it would be best to remember the saying, “Everything in moderation.” Prolonged use is not advised.

The most effective strategy for reducing the risk of developing musculoskeletal disorders is to ensure that office chairs meet the individual dimensions of the user, overall office equipment is adjustable, and proper rest and exercise breaks are taken. ●HS

The advantages while sitting on an exercise ball may not outweigh the disadvantages.

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