

The Use of Stability Balls in the Workplace in Place of the Standard Office Chair

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The stability ball is a large (diameter ranging from 60 to 100cm) inflated ball primarily used for core stabilizing exercises such as abdominal crunches and back extensor exercises^{3,13}. Stability balls are also often used in rehabilitation settings to aid in whole body balance development and control. However, recently, their popularity as an alternative to the standard office chair has risen.

Stability ball manufacturers claim that using the ball in place of an office chair has benefits such as increased trunk muscle activation and thus increased core strength, improved posture, and decreased discomfort. The claim of decreased discomfort is based on research that has shown a positive relationship between reduced trunk muscle strength and individuals with low back pain^{1,6}. However conflicting research has reported no relationship between strength and low back pain². Other research, however, points to reduced trunk muscle endurance, not strength, as being a better indicator of which individuals report low back pain⁷.

It is well accepted that more neutral spine postures during workplace exposures may reduce the development of low back pain¹¹. These ideas suggest that if the claims made by stability ball companies are in fact correct, then the stability ball may have some potential to decrease and/or prevent low back pain associated with prolonged seated work. However, prolonged exposure to increased muscle activation may also be detrimental to individuals, as research has shown that muscle activation with few rest breaks, over extended periods, can result in localized muscle pain or overload^{5,12}.

Prior to the work conducted at the University of Waterloo, no study has ever directly compared the trunk muscle activation and spine posture of individuals while sitting on a stability ball to those on a standard office chair. However, anecdotal evidence suggests that while initial use of a stability ball as a chair may induce low back pain, progressive use may actually help reduce low back symptoms after the user has accommodated to using a ball as a chair⁹. A recent study by O'Sullivan and colleagues¹⁰ examined differences in trunk muscle activation and spine posture while sitting on the SitFit™, an air filled cushion that is placed on top of the users seat pan with similar claims to stability ball manufacturers, as compared to a standard office chair for a short five minute duration of sitting. While they found no differences in trunk muscle activation, spinal lordosis, or pelvic tilt, they did observe increased spinal sway while on the SitFit™; however this may simply be participants getting settled on the device given the short duration of the seated exposures.

The first study conducted in Dr Jack Callaghan's lab⁴ examined trunk muscle activation patterns and lumbar spine posture in 14 healthy men and women while sitting on a stability ball for one hour, and in a standard office chair for one hour, presented in random order. Results showed no significant differences between the muscle activation patterns while on the ball versus the chair with the exception of the left thoracic erector spinae muscle, which could be attributed to handedness

Key Messages

- Stability balls do not provide any inherent benefits in the absence of other physical training and workstation interventions
- Over a prolonged period of sitting (one hour) no differences in trunk muscle activation patterns were observed, suggesting the ball does not aid in core strengthening
- The ball does not actually provoke an improved posture as no differences were found in lumbar spine posture
- Individuals complained of more discomfort when sitting on the stability ball
- Use of ball as a chair may increase the risk of developing low back discomfort and increase the risk of sustaining an injury due to the unstable nature of these balls.

and workplace interaction while sitting on different surfaces. Further, increased discomfort in both the low back and buttocks region was reported by all individuals while sitting on the ball as compared to the chair.

A similar study conducted in Dr Stuart McGill's lab⁸ further examined muscular activation patterns and lumbar spine posture while sitting on a stability ball, but compared it to sitting on a standard wooden stool. This study also found no significant differences in muscle activation and lumbar spine posture. Further, this study had the added advantage of the quantification of low back compression and spine stability while sitting on the two surfaces but found no differences in the magnitude of these measures between the ball and stool. Both these studies employed individuals who were not habitual users of balls as office chairs and no accommodation training was provided.

Conclusion

Given the results of the work conducted at Waterloo, it appears as though there are no benefits to sitting on a stability ball as compared to a standard office chair and claims made by stability ball manufactures, as stated above, were disproved by the current work. Over a prolonged period of sitting (one hour) no differences in trunk muscle activation patterns were observed, suggesting the ball does not aid in core strengthening, and no differences were found in lumbar spine posture, suggesting that the ball does not actually invoke an improved posture. Moreover, the most important finding of these studies was that individuals actually complained of more discomfort when sitting on the stability ball – disproving the final claim made by manufactures.

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Implications for the Prevention of MSD

It is of the authors' opinions that stability balls should not be used as an alternative to the standard office chair since the device itself, in the absence of other physical training and workstation interventions, does not seem to provide any inherent benefits to the end user. Further, using the stability ball as a chair may actually increase the risk of developing low back discomfort and may increase the risk of sustaining an injury due to the inherent unstable nature of these balls.

Position papers are funded by the Centre of Research Expertise for the Prevention of Musculoskeletal Disorders, which receives funding through a grant provided by the Ontario Ministry of Labour. The views expressed are those of the authors and do not necessarily reflect those of the Centre nor of the Province.

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