Long term use of the Fitness Ball in the Worksite Setting: A Survey of Administrative Office Workers

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Abstract

Fitness balls are used in both the fitness and industrial settings for exercise and core stabilization. The Injury Reduction Program assigned fitness balls (65 cm) to university staff personnel who have had prior issues with posture and back pain. Our objective was to conduct a survey of staff that had used the ball over a specific time frame in order to see if the ball had any impact on their work status, and any postural changes. Methods: The staff (n=10, mean age 42.2 years) used the balls in addition to or in place of a chair from 5-8 hours per day for a period of just over one year. At the end of that time, staff performed a telephone survey to detail aspects of using the ball such as pain rating and safety concerns.

Results indicate that 40% of staff personnel use the ball for the entire work day. 60% of respondents felt that the use of the fitness ball improved posture in their sitting position. All of the staff members ranked the fitness ball superior in comfort to the use of their standard issue chair. Others have used the ball during pregnancy and after injuries as opposed to work chairs. Conclusions: The use of a fitness ball during work hours may help with balance and injury prevention issues, and increase muscle tone to specific areas of the body. This report differs from a previous report stating that persons with back issues should not sit on a fitness ball for more than one hour at a time.

Key words: fitness ball, posture, ergonomics, sitting, balance, low back pain

Introduction

The use of the fitness ball in the work setting is a relatively new aspect of ergonomic and postural assistance for administrative employees. There is a clear lack of research in the area of workplace ergonomics, suffice to say that there are two distinct viewpoints on the use or non-use of this apparatus in the office setting. The first viewpoint stems from an ergonomics newsletter commentary (10) which states that fitness balls should not be used as workplace equipment, except when prescribed as treatment or rehabilitation. The second viewpoint argues that fitness balls make a difference in posture and muscular strength in users who substitute them for office chairs. Reports from Merritt (2, 3) have acknowledged the current controversy, and have presented case reports from patients with back pain who use the fitness ball instead of chairs for work settings and activities for daily living (ADLs). In both reports, patients improved the level of severity and frequency of muscular pain, reduced chiropractic office visits, and relieved general symptoms of musculoskeletal fatigue. Fitness balls have also been used in the classroom setting to improve muscle dynamic testing (9), and hyperactivity symptoms (8). In both reports there were slight improvements in behavior, balance, and word productivity assessments. A recent report by Marcarian (11) using surface EMG electrodes found that persons sitting on a fitness ball with rollers had higher core EMG activity and balance, and lower cervical muscle EMG activity than persons using a high-back chair. These reports point to the fact that using the fitness ball may be beneficial for persons who normally use chairs for chronic work situations. A report from Gregory (12) reported the use of fitness balls vs. chairs to compare muscle activity and comfort. Office workers sat for one hour on each apparatus, and results indicated increased EMG activity in the spine, and increased perceived discomfort while sitting on the ball. The authors conclude that new equipment designs should be investigated based on the results of this report of 14 workers.

With the results of these studies in mind, the purpose of this survey was to acquire information as to the sitting habits of administrative staff that choose to use a standard size fitness ball as their main type of seat, or as a supplement to a standard issue chair or ergonomic chair provided at their worksite. A second aim of this survey was to detail the amount of time spent on fitness balls as seats and to discern if any benefits may exist in sitting over long periods of time.

Methods

Fitness balls were issued to 10 university staff based on request (nine women, one man). This equipment is part of the injury reduction program for one university department, and is signed out to employees in various departments who have had previous issues with posture, back pain, or other medical conditions. Balls were issued in 2006 through 2007, with the

average 1.2 years in use (.33 months to 2.0 years). The standard size ball is a 65 CM rubber ball (Stretchwell, Inc., Newtown, PA) filled to 80% or more of capacity. Most staff use the ball with no special gear. One staff member does use an ergonomic foot pedestal under the desk to elevate her feet (as she stands 5'0" tall). The average age of employees was 42.4 years (44.0 years of the women users alone). Forty percent (40%) of staff uses the ball for the entire work day in place of standard issue or ergonomic chair. Figure 1 highlights information about our fitness ball users.

Results

Every staff member who currently uses the ball (100% of surveyed) ranks the equipment as superior to their standard issue or ergonomic chair from the standpoint of postural enhancement, and stabilization (less slouching). The average time frame for using the ball during the business day was over 5 hours (5.2), with three staff using the ball as their only mode of sitting (8 hours plus). There were no incidences of falling off the ball, or tripping over it while getting up or moving around the office space. Balls are stored under desks while not in use, so they are not subject to rolling into hallways or into other work stations. Almost half of the staff surveyed had a previous problem with posture (rounded back, weak muscles, slouching). Eight out of ten (80%) felt that using the ball improves balance, and allows them to sit straighter than in a chair. One staff reported using the fitness ball during pregnancy to help in sitting straight as her abdominal area grew over time. Another staff member states that using only the fitness ball helps her with computer work during the day while recovering from a hamstring injury. One of the staff participants has actually developed low back (erector spinae) musculature to over .5 inch thick by using the fitness ball on a full-time basis (no resistance exercise training for the back – measured from the mid spinous process of the vertebrae at L-3 with a standard ruler). All of the fitness ball users feel they are improving some area of physical well-being from using the ball as part of their work routine.

Discussion

Results of this survey suggest that in a small self-selected group of mainly female administrative workers, the fitness ball does provide some benefits in terms of postural enhancement, balance, and stabilization in comparison with standard-issue chairs. Fitness balls were well received by staff, and were not involved with any work-related injuries. In general, fitness balls may provide some improved outcomes with staff who have issues with slouching over their desks, or who have general issues with posture, such as being unable to maintain a neutral spine while sitting, or having fatigued low back muscles while engaging in a sitting posture for prolonged time periods. The differences between this report (self selected survey) versus the report by Gregory et al (12) is that our staff used fitness balls for much longer time periods during the day (over five hours), and used the balls for an average of 1.2 years. Gregory's study was a one-time, one-hour evaluation that produced results in persons who may have used the fitness ball for the first time. Results are skewed to the testing procedure, as opposed to our retrospective design in surveying personnel who already are using the fitness ball as equipment.

Statements by the ACT newsletter (10) that high levels of fatigue result from sustained used of fitness balls were not reported in staff we surveyed. On the contrary – all staff reported higher levels of muscular energy and strength as a result of using the product. The issue of no back support has also been addressed by industry (although not with our staff), in that companies such as Evolution Chair and Bodytrends.com offer office fitness balls on five leg

rollers or with a support back rest. The authors also state that fitness balls offer no adequate support for buttocks and thighs. This may depend on the inflation level of the ball. If persons are sitting on a highly inflated ball, then they would receive full support to the gluteal area, especially if both ishial tuberosity bones are placed directly on the ball. The thigh muscles are usually minimally activated while sitting on the ball – which is one of the reasons for using the fitness ball in the first place.

Using the fitness ball over long time frames may generate significant muscular tone necessary to improve balance, decrease discomfort, and increase strength. It may also reduce the risk of injuries because staff workers know the ball is a part of their office space, and move accordingly.

In conclusion, the results of this survey indicate that administrative staff personnel who use fitness balls for five or more hours each work day over long time frames report improved posture, enhanced muscular endurance levels, and improved balance while using the balls, and suffered no adverse effects or injuries during office use. Studies with larger groups of office staff in different work environments may shed additional information as to the benefits and drawbacks of using fitness balls as sitting devices. We are currently surveying a larger pool of administrative workers for an upcoming report.

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Figure 1: Demographics on Fitness Ball Users

M/F	Age	Time on Ball	Previous Problems	Comments
Male	28	8.0 hours	Poor posture	Sits straight
Female	56	8.0 hours	Low back pain	Helps balance
Female	51	8.0 hours	Poor posture	Back stronger
Female	47	4.0 hours	Chair issues	Helps balance
Female	35	2.5 hours	Poor posture/ back pain	Stabilizes
Female	34	4.0 hours	Chair issues	Helps balance
Female	50	2.0 hours	General posture	Helps balance
Female	38	3.5 hours	Pregnancy issues	Sits straight
Female	48	8.0 hours	Poor posture	Helps balance
Female	47	5.0 hours	Hamstring injury	Helps balance
AVE:	**44.0 (42.4)**	**5.2 hours**	***Postural (50%), pain (30%)**	***Balance (60%)**

* Legend: Postural problems in 50% of staff, pain in 30% - improved balance in 60% of staff

Photo 1 shows design worker using the fitness ball as primary seat, and can balance while crossing legs
Photo 2 shows employee performing light stretches while seated on the fitness ball
Photo 3 highlights employee performing multiple tasks while using the fitness ball