Isometric Exercise May Benefit Patients With Chronic Pain

BY KERRI WACHTER  Senior Writer

WASHINGTON — Low-intensity isometric exercise appears to significantly ease the perception of pain in healthy young adults, suggesting that such maneuvers could be a pain management tool for older adults with chronic pain conditions but limited mobility, according to research presented at the annual meeting of the American Pain Society.

In the study, 22 college-age adults performed isometric contractions of the left elbow flexor muscle at an intensity equal to a quarter of their maximal voluntary contraction held until task failure. Collecting the exercises, the duration it took for patients to first feel experimental pain, or the pain threshold, increased by 58%, compared with baseline, reported Marie Hoeger Bement, Ph.D., professor of physical therapy at Marquette University in Milwaukee.

These findings could have important implications for patients with chronic pain conditions. “Isometric contractions are very easy to prescribe and individualize.” These exercises are useful in patients with limited mobility or a fear of falling,” said Dr. Bement. These exercises are especially useful in patients with limited mobility or a fear of falling. “Almost anybody can do it.”

In a previous study, participants’ baseline pain threshold, a weighted blade was placed for 2 minutes on the right index finger of the 11 men and 11 women. The students held a timer in their left hands and were instructed to trigger the timer when they felt pain. The students also were asked to rate their pain on a 0-10 point scale every 20 seconds during the 2-minute test.

Each participant completed in four sessions. For the first session, students performed three maximal voluntary contractions (2 seconds in duration). The next three sessions were randomized.

Patients could be asked to perform a contraction at 25% maximal voluntary contraction to failure (8 minutes on average), at 25% maximal voluntary contraction for 2 minutes, or at 80% maximal voluntary contraction to failure (40 seconds on average). A force transducer measured the force of the contractions. Intensity was based on a percentage of the maximal contraction.

During the session of three maximal voluntary contractions, there was a statistically significant increase in pain threshold over baseline, a finding that Dr. Bement said was “very surprising.” She added, “I’m amazed at what potential exercise has in managing some of chronic pain conditions.”

Pre-test pain ratings at 40, 60, and 80 seconds also were significantly decreased. The effect on pain rating appears to be short lived, however, as pain ratings returned to baseline levels by 2 minutes.

When students performed at 80% maximal voluntary contraction, there was no change in the pain threshold; however, there were improvements in pain ratings at 40 and 60 seconds. When students performed at 25% maximal voluntary contraction for 2 minutes, there were no changes in either the pain threshold or the pain ratings.

When students performed at 25% maximal voluntary contraction to failure, there was a roughly 50% increase in pain threshold over baseline. Likewise, pain ratings were decreased at all time points between 40 and 120 seconds.

During the low-intensity, long-duration session, women reported greater pain ratings than did men, both before and after contractions. Women also reported greater increases in pain in than did men during the 2 minutes test. “What’s really exciting is that women have a tendency to report greater decreases in pain than men after that low-intensity, long-duration contraction.” So they’re experiencing a greater analgesic effect than are men, Dr. Bement said.

To assess whether the sex difference in pain perception was because of hormonal fluctuations in the women, the researchers recruited 20 healthy, college-age women to perform the low-intensity, long-duration voluntary contraction (25% maximal voluntary contraction until failure). The women were tested during the midfollicular phase (5-8 days past menses) and the midluteal phase (6-8 days past ovulation). Ovulation was determined using an ovulation test kit.

Baseline pain threshold did not vary with hormone phase. The pain threshold increased with contraction for both menstrual phases, similar to the increases seen in males. Likewise, phase made no difference in pain ratings. Similar to the first study, the women reported decreased pain from 40-100 seconds with exercise, regardless of phase.