Biomechanical evaluation of surgical loupes

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Work-related neck pain is common among microsurgeons who operate with loupes, with over 80% relating it to performing surgery. Despite this known occupational risk, the cause, prevention, and treatment of neck pain have been ignored in this population. In this ongoing study, the effect of different loupe conditions: (1) no loupe,(2) loupe with telescopes mounted at 10°, (3) 20°, and (4) 30°, on the head-neck posture and the neck muscle activity was evaluated. An eight camera 3D optical motion analysis system and a surface electromyography system were used to record the posture and muscle activity data, respectively. So far, data from 4 participants were recorded. Each participant performed simulated suturing tasks in the lab setting after being adequately trained by an experienced surgeon. Head-neck flexion, bending and rotation angles were significantly affected by the loupe condition. Use of loupes reduced the cervical flexion, but increased the bending and rotation angles. No significant trend in the cervical posture with respect to the different telescopes angles (10°, 20° and 30°) was observed. Muscle activity was statistically not affected by the loupe condition, however, higher muscle activation was observed for loupes with telescope angles of 30 degrees.

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