Ergonomic assessment of the static stress confronted by surgeons during laparoscopic cholecystectomy

BACKGROUND Only a few reports on static strain in the spine, neck, and head of the surgeon are available, describing it as distinctly harmful. The aim of this study was to objectively prove the static burden during laparoscopic operations. For this, new industrial software called PCMAN was used, capable of measuring and comparing the postures of the surgeon at different monitor placements. METHODS Two simultaneous and synchronized video recordings of laparoscopic cholecystectomies (LC) were done using miniDV digital camcorders with the cameras standing at a 90 degrees angle to each other. Twenty operations were performed using two different placements of the monitor. In 10 cases, the monitor was placed at the patient's head in the center, and in 10 cases at the left side of the patient. Using the time codes of the recordings, different steps of the operation were identified, and the duration of these measured in seconds. Very characteristic, longer lasting postures were imported to and analyzed with the software. Results of the different setups were compared to each other, and to an ideal comfort posture. RESULTS During the intermediate steps of the operations the rate of static phases is significantly higher. Measuring the typical postures of these phases the trunk and head are significantly more rotated and bent than in comfort positions. When the monitor was at the side of the patient facing the surgeon, results were closer to the comfort posture. CONCLUSIONS It
was proven that surgeons are confronted by significant static burden during LC. The software used was able to evaluate objectively the static posture of the surgeon during series of LC. Results also confirmed that the position of monitors significantly influences the surgeon's posture. Best setups for the whole team can be achieved by adjustable multiple monitor systems.

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