

Ergonomics in surgery

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Abstract

To improve patient safety during laparoscopic surgery a three fold approach of the problem is conducted. Firstly, by improving the physical ergonomics of the team, secondly by improving the informational ergonomics during the operation, and thirdly by take a human factors look at the procedures. In this paper the first part improving physical ergonomics is discussed. One of the main and basic ergonomic problems during laparoscopy is the surgeon's non-neutral posture during laparoscopy. There are five main issues that influence the posture of the surgeon: the (hand-held) instrument design, the position of the monitor, the use of foot pedals to control diathermy, the poorly adjusted operating table height, and the static body posture. This paper shows an overview of the ergonomic guidelines that were developed on these five areas and shows product solutions that were developed according to these guidelines. The guidelines can be used by operating room (OR) staff to evaluate the ergonomics of their OR environment and to improve issues that do not satisfy the ergonomic guidelines. When designers use these guidelines to design new OR equipment, the new designs are an improvement in the field of human factors compared to the currently used laparoscopic products. When all these products are applied in the laparoscopic operating room, a new and ergonomic environment is created for the surgeon as well as for the assistants.

Introduction

In the past decade many studies have reported on the physical discomfort during and after the use of laparoscopic instruments (Berguer, 1997, 1998b, 1999a, Matern & Waller, 1999, van Veelen, 1999). Complaints such as pain or numbness in the neck and/or upper extremities and disturbed eye-hand coordination have been mentioned. These complaints are mainly ascribed to the non-optimal ergonomic environment of the laparoscopic surgery room (Berguer, 1998b, 1999a, Matern & Waller, 1999). Examples of ergonomic problems are the neck torsion imposed on the surgeon by an inadequate position of the monitor and extreme upper limb joint positions caused by a decrease in the measures of freedom and insufficient adjustability of the operation table (Berguer, 1998a, Matern & Waller, 1999). Since the publication of the National Academy of Sciences report 'To err is human: building a safer health system' by Kohn et al. (1999) the application of human factor analyses to prevent

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