Surgeon’s Opinions of Articulating Laparoscopic Graspers
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Introduction:
A new articulating, ergonomic laparoscopic tool was developed based on task analyses and interviews with expert laparoscopic surgeons. The unique features are an end effector with an articulated mechanism that allows to rotate the graspers up to 60° from the shaft in any direction and is controlled by moving the trackball on the handle. The prototype to conventional laparoscopic graspers using a survey.

Aim of the study:
To compare a prototype articulating laparoscopic tool with existing tools using expert laparoscopic surgeons.

Methods:
Directly after laparoscopic surgery training, 38 surgeons were surveyed to compare a conventional grasper to the prototype articulated laparoscopic tool. Each subject was given time to practice with each of the tools and most used a clear model torso to become accustomed to the tools. After practicing with both tools, surgeons completed the survey questionnaire. The first question asked about problems or discomfort encountered during or after surgery. A second set of questions asked which of these they thought the prototype tool would relieve. Another set of questions directly compared the conventional and prototype tool for comfort and overall impression. The addition of the articulation and interest in using the tool when available were the final questions.

Results:
When comparing conventional tools to the prototype, there was statistical preference towards the comfort of the prototype handle (p<0.001). A significant number of surgeons (p<0.001) also preferred the prototype tool over conventional tools, based on the general impression.

Figure 1. Percentage of Surgeons Experiencing Problems in Specified Areas

Figure 2. Percent of surgeons believe Intuitool would relieve indicated problems

Conclusion:
The results of this questionnaire agreed with those of previous studies that laparoscopic surgeons are subjected to pain and discomfort caused by the tools they used. Fifty-eight percent of the respondents believe the prototype tool will relieve hand/wrist pain and 53% hand/wrist stiffness. Successful addition of an articulating tip is believed to be useful by 92% of the surgeons. Most respondents believe the new design will relieve at least one problem experienced during surgery. This study demonstrates that good ergonomic analysis and design can improve a standard laparoscopic tool. It further demonstrates that given a choice between current tools and ergonomically designed tools, laparoscopic surgeons will select the more comfortable, more useful tool.

New laparoscopic instrumentation based on surgeon-centered design principles will reduce musculoskeletal discomfort.