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Minimally-Invasive Surgical Instrument Handles: The Comparative Review

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Abstract: Minimally invasive surgeries provide several known clinical benefits to patients such as reduced postoperative pain, quicker recovery time with potentially less wound complications. This surgical approach has been increasingly attractive to patients and referring doctors alike. The surgical tools used in laparoscopic surgery are still being designed to provide the best operative condition, and many have been developed based on conventional surgical tools. Thus, the design of these instruments should be fundamental to the result of the surgery. Current laparoscopic instruments have commonly been found to be less ergonomic and may actually be doing harm to the highly trained surgeon. Additionally, poor laparoscopic tool increase physician fatigue, creating potential for errors that may harm the patient. The discomforts associated with the device design flaws such as an angle of handling and mechanics of the instrumentation as well as pressure points have been observed. Various types of handles, such as ring and shank handles angled to the instrument shaft or with axial extension, as well as pistol handles, are currently available. Ergonomic laparoscopic instruments were developed for many reasons, such as laparoscopic instruments cause excessive flexion and ulnar deviation of the surgeon's wrist during tissue manipulation. Conventional laparoscopic instruments do not allow the surgeon to alter his or her body and arm position to facilitate manipulation at different internal instrument angles, a large external arc of arm movement due to the increased length of the instruments. This paper provided the review for several types of laparoscopic tool handles for the past ten years.