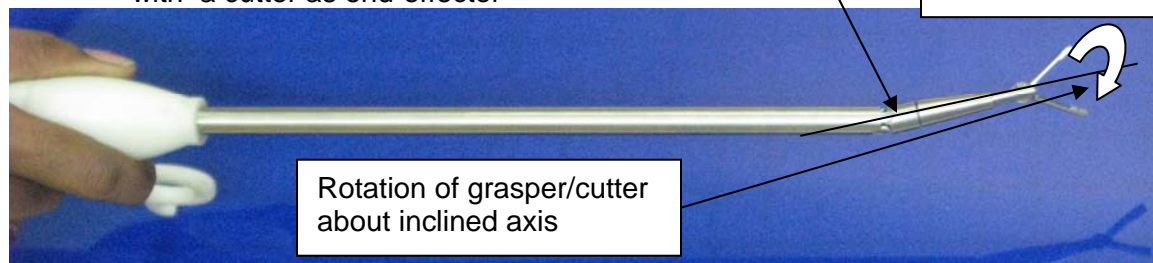
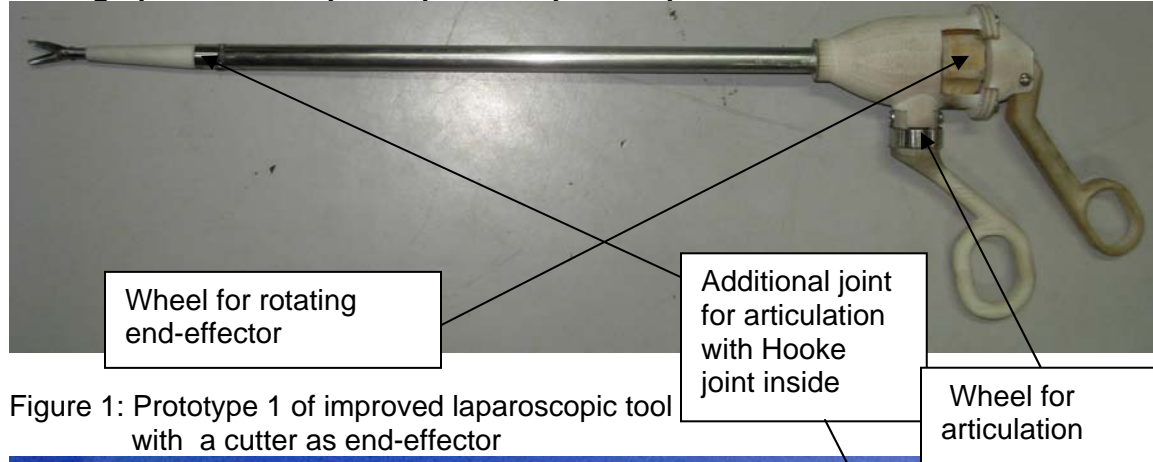


## Improved Laparoscopic Surgical Tool

The improved laparoscopic tools, shown in Figure 1 & 2 below, overcome the lack of dexterity in minimally invasive laparoscopic surgery to a large extent. The new tool has an **additional joint** near the cutting/grasping end and one can actuate this joint using a finger as normally done for other degrees of freedom. This joint allows one to **approach** the organ/tissue or the object being cut/grasped etc. **at different angles** and not only from one direction as in existing laparoscopic tools. The increased dexterity allows the surgeon to **avoid** obstacles, other organs, access the surgery area more easily and provide a better view of the surgery area. The effect of the additional joint is similar to bending of the fingers and the resulting flexibility and increased dexterity during surgery. An important feature of the new design is that the degrees of freedom **available in existing tools** are in **no way constrained or affected** by this extra joint.

### Photographs of developed improved laparoscopic tools



Kumbhare, H., Goel, Piyush, Ramesh Makam, Ghosal, A., *Laparoscopic Apparatus* – Patent applied for in India and USA. Novelty claims agreed to by **WIPO**. Details available at

<http://www.wipo.int/patentscope/search/en/WO2011024200>