



How to Learn Gynecological Surgery?

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Short Communication

During the last decade surgical education using the classical learning-by doing apprenticeship model in real patients came under criticism for ethical and practical factors. In accordance to the benefits of pilot training, several alternatives have been described-starting with simple skill training up to high tech virtual reality trainers.

The diversity of trainings systems might be classified using the terms organic trainers, inorganic trainers and combined trainers.

Organic trainers summarize human cadavers, living animals or animal cadavers/parts of animal cadavers. Surgical training in human cadavers has the highest quality concerning the operation specific recapitulation of anatomic and topographic facts. Education in living animals underlies strict ethical rules, thus the operation in parts of animal cadavers is more common. Disadvantages of organic trainers are a certain odor, the limitation of planned pathological conditions and the risk of infections.

Inorganic trainers are classical box trainers, advanced trainers and virtual reality systems (VRT) including the subgroup of robotic assisted VRT's.

Box trainers are a classical tool for e.g. skill training, admittance training or suture training. They are associated with low costs and should be the classical trainings tool of the young surgeon. Advanced trainers allow parts or complete operations e.g. surgery of a kind of artificial foam hysterectomy etc. In advanced system organic imitations are in general not perfused and cannot be coagulated. These systems are rather expensive for the daily clinical routine and therefore more useful in courses.

Virtual reality trainers (VRT) can be compared to a wii-system, imitating a specific underlying problem which should be resolved by a specific operative procedure. Defined pathways are programmed. Meanwhile some haptic systems are available.

VRT's have a large potential, as operations with different reproducible pathologies and degrees of difficulty are available. They are also available for robotic systems. A disadvantage is the high cost of VRT which limit the general use.

Combined organic/inorganic trainers such as the Realsimulator system combine the advantages of organic material (bipolar/monopolar coagulation, realistic preparation of layers, complete

OPEN ACCESS

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Received Date: 01 Oct 2017

Accepted Date: 30 Oct 2017

Published Date: 03 Nov 2017

Citation:

Spüntrup C, Spüntrup E, Banerjee M. How to Learn Gynecological Surgery?. Clin Surg. 2017; 2: 1715.

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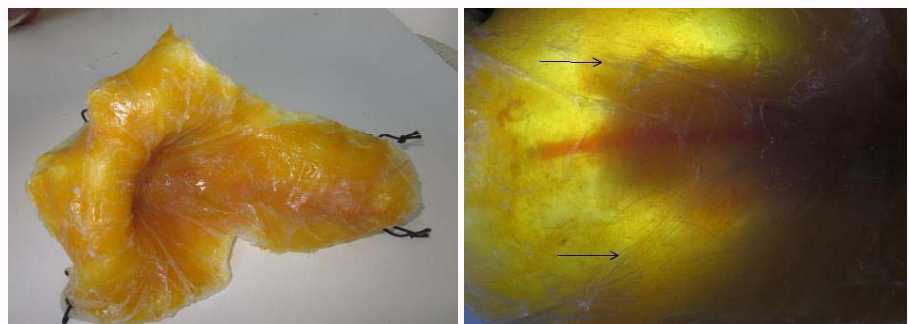


Figure 1:

operative situs) with inorganic systems (reproducibility, reproducible pathologies, realistic haptic, no odor). Gynecological basic surgery (e.g. ovarian cyst enucleation, hysterectomy), descensus surgery (sacropexy (compare Figure 1), pectopexy, lateral repair) as well as incontinence surgery (colposuspension) and skill training moduls are available. The imitation of reproducible, anatomical correct complete operation with classical landmarks and the possibility to use all instruments realistic-even coagulation or morcellation- makes this system interesting for young surgeon up to advanced surgeons. The costs for the basic station and refill material are comparable to box trainers. Complete systems including instruments and optical systems are available.

The different educative possibilities of organic, inorganic and combined trainings systems should not be considered as competitive systems, but rather as complementary trainings opportunities- depending on the trainee's operative level and his specific trainings aim. The tripartitude into novice, junior and expert reflect different trainings aims depending on the educative level:

Novices: are inexperienced in all fields. Their education should focus on hand eye coordination, skill training, guiding of instruments and theoretical knowledge (anatomic landmarks, operative steps etc.).

Juniors: start to get a certain survey on operative procedures. Their education should focus on the implementation of automatisms concerning the single steps of a certain operative procedure and the routinized control of instruments. On their way to become an expert,

they will also learn how to handle difficult intraoperative situations, complications etc.

Experts: developed automatisms for operative basics, a founded knowledge and internalized pathways for many intraoperative situations. Intraoperative movements are economic. Their educative aims should focus on the guidance and supervision of novices and juniors.

In accordance to this tripartitude of training levels findings of behavioral sciences guided surgical education from the former favorised focus on manual dexterity to modern trainings aims such as operative survey and automatisms concerning intraoperative decisions. This means that surgical education does not stop at the level of a trained novice with a certain manual dexterity and fact knowledge, but continues until the expert level with a good operative survey and a large fund of automatisms is generated.

Concerning the different subordinated trainings aims repeated interval training seems to be more useful concerning long-term trainings success than a single shot training.

Using the theoretical knowledge and the existing, valuable practical tools of surgical education, it would be eligible that young surgeons get the opportunity to pass through a guided educative system comparable to pilot training. It is in our responsibility to create such a system – on department level as well as on superordinated levels.