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A CONCEPT PAPER : MICRO-MINITUARISED OPERATING BOTS (MMOB) IN BENIGN GYNAECOLOGICAL SURGERY (REF: 284)

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Objective :

- To introduce the concept of Minimally Invasive Surgery (MIS) in the presence and perfection of :
1. A) Micro-Minituarised Operating BOTS (MMOB)
 2. B) SSRV (Specialised Specimen Recovery Vehicles).
 3. In benign gynaecological surgery
 4. Not in reality yet. Can do. Yes. An Innovative Concept Paper. Needs configuring and fine-tuning.

Micro-electronics and Nano-technology

- Wireless control, many lessons learnt from drone technology
- Minituarised circuit boards, Micro-motors,
- Better water-proofing technology
- Non-toxic, Non-pyrogenic materials
- Traction & Motion – is an issue but solvable
- Need to learn from worms, snakes,snails, caterpillars, centipedes, earthworms, small micro-creatures with micro-movements and “nibblers”.

Specimen Collection & Recovery

- SSRV (Specialised Specimen Recovery Vehicles).
- How a grasshopper nibbles on leaves
- The arms of a praying mantis
- The nibbling of a snail’s mouthpiece
- Swiss Army design, 3 in 1; 6 in 1; 8 in 1 gadgets.
- Micro-ergonomic slender pods for secure specimen encapture
- Specimen encapture recovery – to be elucidated.
- (akin robot vacuum cleaner “homes” in to its charging pod).

Vision & Illumination

- LED lights – not hot requires very low energy

Methodology 1.

- Methodology : In the years to come –
- Micro-Minituarised Operating BOTS (MMOB) and
- Specialised Specimen Recovery Vehicles (SSRV) with non-spillage precepts,
- That operate in coordinated seamless fashion
- Controlled by an expert trained Specialist Gynaecologist and
- A powerful micro-processor (outside the body) that are
- Special slimfit atraumatic smooth agile with controlled movements that have
- Sheathed operating arms either singly or in pairs or threes can
- Perform selected operations in benign gynaecological surgeries Under anaesthesia.

Methodology 2.

- They will outperform :
- In terms of pain, Post-operative recovery, Adequacy of operation,
- Specimen recovery, Safety, Achievement of operating objectives
- And other aspects including being scar-less depending on chosen route of entry ie. Sub-Umbilical or Intra-Umbilical below, Cervix-Fallopian tubes, Vaginal or other routes.

Methodology 3 :

- Entry is designed via the cervical os - fallopian tubes (natural orifice) or vagina or Umbilical (as above).
- Specimen recovery with the SSRV may require small precise vaginal exit.
- Designed for fast dis-assembly for sterilising and cleaning and re-use.
- Software uploads enabled. Pneumoperitoneum is an option for clearer vision and to avoid surgical clutter.
- Battery life is designed for 24 to 48 hours life (Biologically safe and non-toxic – sealed). In case of non-recovery & contingency can do standard laparoscopy and to scoop MMOB out in standby mode if required. Software system integration security and coordination enabled.

Fallopian tube dimensions :

- Width / Diameter 1 to 4mm (slightly stretchable).
- Length – approximately 8 to 12cm.,
- Do not damage cilia or fragile endothelium
- Relatively less muscular structure – prone to damage

Alternative Points of Entry for Mini-Bots :

- TRIAL PHASE FOR MINI-BOTS 1. Single intra-umbilical incision (Safe Entry Techniques – Palmers Tests). Special Mini-Bots pods. Recovery of Mini-Bots and Specimen Pods via same incision.
- 2. Fallopian tube ostia via cervix
- 3. Small incision in cleared vagina (internal opposite of Pouch of Douglas path). Always provided no bowel adhesions. Can view 1st.
- Live Performance Edits (+ Direct view via Mini-Bots camera) :
- 4. MRI imaging of Mini-Bots in abdomen-pelvis.
- 5. Spectral map of Mini-Bots in abdomen-pelvis.

Mini-Bots SPECIFICATIONS.

- TYPE A – Intaumbilical entry
- TYPE B – Cervical Os - Fallopian tube or Vaginal entry
- TYPE C – Universal Type A/B combined (later prototypes).

•Results (expected) : Good less pain and safe operations in benign gynaecology can be further accelerated.

Conclusion :

•In the years to come, It will be a reality with MMOB and SSRV operated by specially trained expert Specialist Gynaecologists.

INITIAL : Pre-Operative Preconditions :

•Preconditions May need to be met.

- Purity of concept – Non-humans initial use if allowed or Co-entry during routine standard laparoscopy with standard procedures,
- Informed consent with Ethics Committee Approvals and Preconditions
- Benign gynaecology
- No previous tubal surgery or pathology
- No previous pelvic surgery
- No previous abdominal surgery
- No suspicion of pelvic adhesions
- No bleeding tendencies
- Not pregnant (Serum BHcg < 2.0).
- Bowel preparation – to reduce faecal load – physical usage of abdomino-pelvic space
- Increasing free potential space for greater manouverability
- Healthy individuals / Others.

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