



RIMSCIENCE: 4 Patented Products



EPIA(Epidural Anesthesia Device)



Intelligent Drill



Medical Sewing Machine



Intelligent Surgical Robot System

1. Epidural Anesthesia Assistant Device with Safety Function

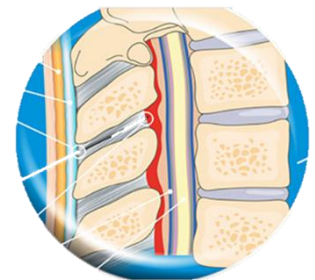
[VETPIA (for animal), EPIA (for human)]

1.1 Concept

- Developed for epidural anesthesia injection and pain relief

1.2. Problems of existing method

- Previously, doctors have found the epidural space by doctor's subjective tactile sense (success rate about 78%)
- Litigation expenses by epidural anesthesia malpractice is about 1-2 billion per year in USA



1.3. Solutions and Characteristics

Auto-detection of the epidural space	
Auto-detection	Auto-detection of the epidural space using mechanical control
Monitoring System	Epidural space confirmation through real-time visual monitoring
Mechanical Control	A doctor's subjective sense can be used in tandem

1.4. Applications

- EPIA's principal characteristic could be applied to other medical procedures/surgeries such as automatic insertion of 'Veress Needle' and 'Chest Tube'
- Also, it could be applied to veterinary medicine in need of epidural anesthesia

1.5. Development/Approval Status

- (2021. 03) **Product Development completed**
- (2021. 05) **CE approval completed**
- (2021. 07) FDA approval, MFDS approval *in progress* (application submitted)
- (2021. 05) Pre-clinical trial (beagles) *completed* (journal preparation)
- (2021. 06) Study protocol for clinical trial *approved*



<EPIA Progress Chart>

Current status	○	○	○	○	△*	△	
Step	Patent	Product Planning	Prototype Manufacturing	Prototype Completion	Approval	Clinical trial	Sales

* CE approved; FDA, MFDS in progress

2. Intelligent Drill with AEB (Autonomous Emergency Braking)

2.1 Concept

- The faster the drill stops right after the penetration, the safer the patient would be

2.2. Problems of existing method

- The drill is utilized to approach to the target site by the doctor's subjective tactile sense and perception

2.3. Solutions and Characteristics

- Intelligent drill was invented based on the idea that the rotational speed changes according to the bone tissue density
- To provide safer surgical power tool, MCU measures the change of the rotational speed from the drill bit and automatically stop at the target location



2.4. Applications

- The principle of Intelligent Drill could be applied to industrial areas

2.5. Development/Approval Status

- (Software) Intelligent drill is a software-based technology, and software could be solely sold. In case the software only option is in demand, it is still feasible.
- (2021. 08) Disposable Intelligent Drill prototype *completed*: Final version by 2021. 10
- (2021. 12) FDA approval *scheduled to be done*
- (2021. 12) MFDS and CE certificates *in preparation*

<Intelligent Drill Progress Chart>

Current status	○	○	○	○	△*		
Step	Patent	Product Planning	Prototype Manufacturing	Prototype Completion	Approval	Clinical trial	Sales

* FDA in progress

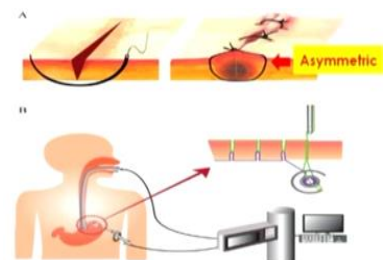
3. Surgical Sewing Machine

3.1 Concept

- A sewing machine with 300 years of history is applied to the medicine in the idea that any doctor could not do a suture better than a sewing machine

3.2 Hand sewing vs. Sewing machine

- Hand: Curved needle & One thread; Sewing machine: Straight needle & Two threads with interlacing principle
- Theoretically, needle injury: curved > straight; Completeness: 2 threads > 1 threads



3.3. Characteristics

- Steady tension, Accuracy, Repeatability, Predictability, Automatic Operation, No knot

3.4. Development/Approval Status

- (2013) American Urological Association, Video presentation
- (2019) American Urological association, Video presentation (Handpiece type linear suture)
- (Present) Developing zigzag type sewing machine in progress**



<Surgical Sewing Machine Progress Chart>

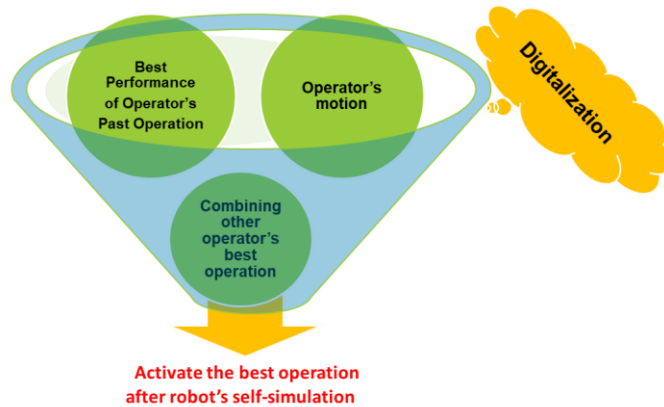
Current status	○	○	△*				
Step	Patent	Product Planning	Prototype Manufacturing	Prototype Completion	Approval	Clinical trial	Sales

* 1st~3rd prototypes developed. Further development is needed to increase the accuracy. In need of capital.

4. Gesture Recognized Digital Robot

4.1 Concept

- Replay the today's best performance tomorrow



4.2. Problems of analog robot operated by unnatural motion

- Unnatural motion: Long learning curve, frequent mistake
- Analog: Impossibility of data storage, copy and re-play

4.3. Applications

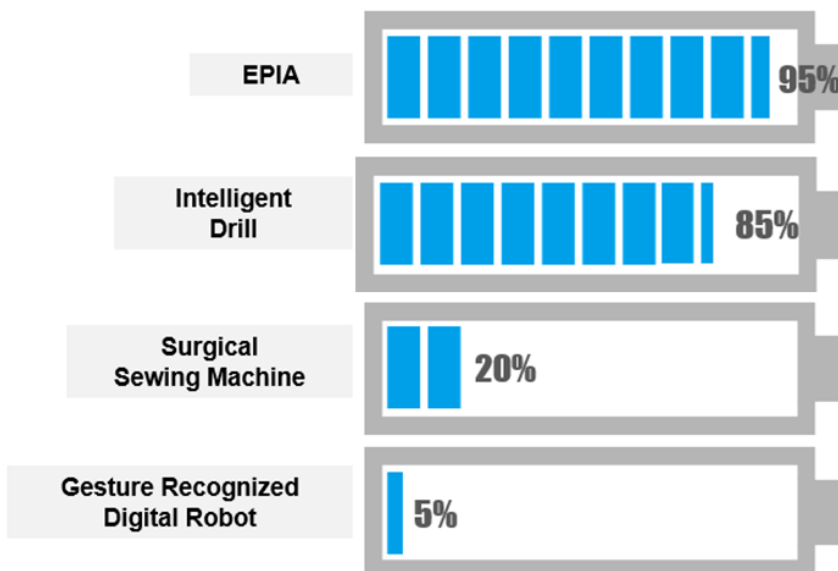
- Doctor's gesture can be operated in a surgical field, miniature and VR
- The user can choose the best one from his/her own procedures and also from other's

<Gesture Recognized Digital Robot Progress Chart>

Current status	○						
Step	Patent	Product Planning	Prototype Manufacturing	Prototype Completion	Approval	Clinical trial	Sales

* At the conceptual level (patent registration done)

[Current Progress of 4 Products]



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