MULTISTAGE CUTTING OPTHALMIC DEVICE [TEAM 46]

Introduction

The invention is related to an instrument which will be used in ophthalmic surgery such as in Vitro-retinal surgery as a hand piece that is portable, fast and effective. Vitro-retinal surgeries involve removing vitreous gel through the help of vitrectomy cutters. The device incorporates a motor-driven rotary tool with multistage cutting capabilities, revolutionizing the traditional vitrectomy process of to and fro motion.

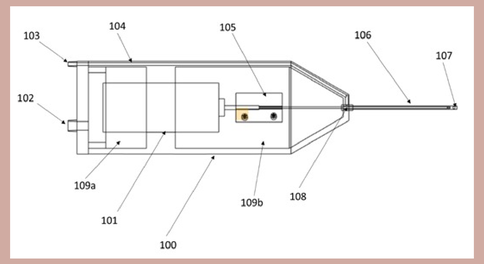
Objectives:

- Increased speed:
  - Speeds up ophthalmic surgery, reduces operator fatigue and retina damage.
- Reduced Residue size:
  - Multistage cutting minimizes residue size for efficient suction.
  - Rotatory motion gives faster cut rate per cycle.

Key Features:

1. Multistage cutting Technology:
   - Rotating tool with multiple cutting edges for efficient Vitreous gel removal.
   - Tool designed with axial variations for enhanced precision.
2. Portable and Reusable:
   - Portable device therefore on damage, Impaired parts could be changed.
   - The compact multistage cutting ensures reduced operation time ,increased flexibility and operational efficiency.
3. Cutting Mechanism:
   - Rotatory motion with increased number of edges ensures increase in number of cut per cycle which reduces operation time and gives an edge over the conventional to and fro mechanisms.
4. Suction Mechanisms:
   - Simultaneous cutting and suction through a concentric system increases efficiency.
   - Sealed chamber prevents residue aggregation, Improving operational efficiency.
   - Tools are mounted on positions varying mesh size which enables proper flow of vitreous gel through aspiration line.

Instrument Design:



Proposed view of Rotating cutter ophthalmic surgery hand piece

Mechanism:

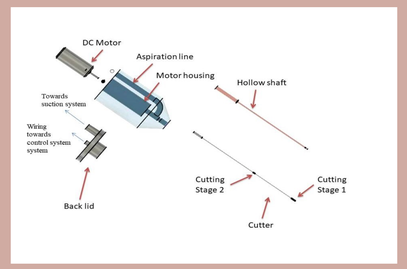


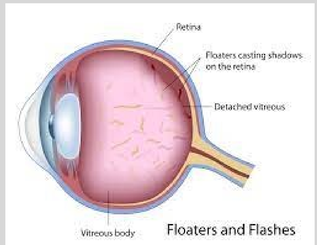
Image showing an overview of working parts.

This device is manufactured with the use of disposable components, hence if required one can dispose of different components of the device instead of the whole handpiece.

Motivation:

Key Requirements:

- The process should be minimally invasive.
- Limitations of conventional tools
  - Restricted cut rates
  - Aspiration line blockage
  - Higher operational cost



Benefits:

Cutting Speed Enhancement:

- Significantly increases the cutting
- Speed for quicker surgeries.

Residue Size Reduction:

- Minimizes the size of vitreous gel
- Residue during the cutting process.

Controls Victrous Constriction:

- Regulates aspiration flow and prevents chocking
- Enables victrous suction while cutting

Control and Adjustability::

- Adjustable motor speed (up to 10,000 rpm/cut).
- Dedicated control system for customization based on surgical needs.

Conclusion:

This innovative multistage cutting ophthalmic device aims to enhance surgical precision, reduce operational time, provide a portable solution, decreased retinal damage risk and reduced clotting of vitreous gel in aspiration line.

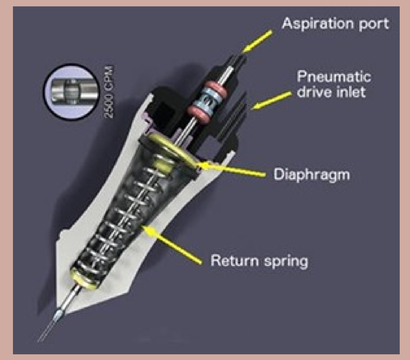


Diagram showing image of proposed model