CIRCULAR CAPSULOTOMY INCISION TOOL

A Novel Surgical Instrument for Cataract Surgery

Abstract

The **Circular Capsulotomy Incision Tool** introduces a precise and economical approach to performing capsulotomies in cataract surgery. The tool ensures sharp, accurate incisions with minimal risk of complications, eliminating the need for expensive laser systems or extensive surgical expertise. It features a **collapsible ring with a sharp cutting edge**, a **pushing rod**, and a **pulley mechanism** to enable controlled incisions with **high precision and reliability**.

Introduction

Cataract surgery is one of the most performed ophthalmic procedures worldwide. The first step, **capsulotomy**, involves removing the anterior capsule of the lens to access and extract the cloudy crystalline lens. **Current techniques**, such as manual **continuous curvilinear capsulorhexis (CCC)** and **Femtosecond Laser-Assisted Cataract Surgery (FLACS),** have limitations, including variability in incision quality, cost, and required expertise. The **Circular Capsulotomy Incision Tool** provides a **mechanically controlled** alternative, ensuring consistent, high-quality incisions.

Motivation

Precision & Safety: Reduces risks associated with manual CCC techniques.
Cost-Effective: Eliminates the high expenses of FLACS and Precision Pulse Capsulotomy (PPC) systems.
Ease of Use: Designed for **all skill levels**, reducing surgical training requirements.
Minimally Invasive: Allows for a **smaller incision** and **less intraocular trauma**.

Methodology

Design:
•**Collapsible, resilient ring** with a **sharp cutting edge**.
•**Push rod mechanism** to collapse and expand the ring.
•**Pulley wheel system** to control rotational cutting motion.
Functionality:
•Inserted through a **2.2 mm corneal incision** in a **collapsed state**.
•Expands to its **circular shape** once inside the anterior chamber.
•The **rotating mechanism** ensures a **perfectly round, centered capsulotomy incision**.

Applications

Cataract Surgery: Replacing manual CCC with a more consistent, safer method.

Ophthalmic Training: Reducing surgical learning curves for residents and junior surgeons.

Low-Resource Settings: Providing an affordable, high-precision alternative where expensive laser systems are unavailable.

Contact

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