Lasers in ENT Surgery
“To Infinity and Beyond”

Disclosure

• I have no financial or other interests in any companies that produce lasers.

Objectives

• 1) The participant will trace the history of laser use in surgery and gain appreciation for the theory behind the technology.
• 2) Applications and benefits of lasers in ENT surgery and list three reasons laser surgery is chosen.
• 3) List three benefits of laser use in the ENT patient.

Objectives

• 4) Name three hazards involved with the use of lasers in the operating room
• 5) Name two possible future ways lasers may be used in ENT surgery in the future.

Theory of Lasers/Masers

In 1917, Albert Einstein established the theoretical foundations for the laser and the maser in the paper Zur Quantentheorie der Strahlung (On the Quantum Theory of Radiation)
What is a Laser?

- Light
- Amplification by
- Stimulated
- Emission of
- Radiation.

- It's a very focused light beam.

Theory becomes Reality

- Maiman's ruby laser, based on a synthetic ruby crystal grown by Dr. Ralph L. Hutcheson, was first operated on May 16, 1960

Uses of Lasers

- When lasers were invented in 1960, they were called "a solution looking for a problem".
- The first use of lasers in the daily lives of the general population was the supermarket barcode scanner, introduced in 1974.

Advertised Uses of Lasers

- Bloodless surgery
- Laser healing
- Kidney stone treatment
- Eye treatment
- Dentistry
- Other
Types and Operating Principles

- Gas lasers
- Chemical lasers
- Excimer lasers
- Solid State lasers
- Dye lasers
- Semiconductor lasers

Getting Light to Tissue
Solid Core Optical fibers
- Core made of silica
- Technology is common in many industries

Cladding
- Optional 2nd clad
- Adds strength

Outer jacket
- Adds flexibility

Important for nursing staff to understand how to care, handle and possibly repair, clean, and sterilize the fibers.

Hollow Core Waveguide “Fibers”
- Beam travels through air
- More like a “flexible” articulated arm
- Used only with some wavelengths that can’t travel through solid core fibers
- Not as flexible or small
- Care, handling, and cost is different

Areas of laser use in ENT surgeries.
Laser use in external auditory canal

- Vascular lesions
- Polyps
- Exostose
- Stenoses
- Tumors

Laser use on Tympanic Membrane

- Secretory Otitis Media
- Acute Otitis Media with Vestibulocochlear
- Acute Eustachian Tube Dysfunction
- Tympanic Membrane Perforations and Atrophic Scars
- Barotrauma
- Graft Fixation for Tympanic Membrane Defects

Laser use in Middle Ear

- Medialization of the Malleus
- Malleus Fixation
- Tympanosclerosis
- Ossicular and Prosthetic Dislocation after Tympanoplasty
- Cholesteatoma
- Otosclerosis
- Stapedotomy

Laser use in the Inner Ear

- Cochleostomy
- Peripheral Vestibular Disorders
- Tinnitus and Sensorineural Hearing Loss
- Acoustic Neuroma

Lasers in Rhinology

- Turbinate Reduction
- Septoplasty
- Paranasal Sinuses
- Lacrimal Duct Surgery
- Choanal Atresia
- Epistaxis
- Tumors
- Rhinophyma

Laser use in Oral Cavity

- Lingual Tonsil
- Vascular Malformations
- Tumors
- Labial and Lingual Frenoplasties
- Sleep Apnea
- Tonsillectomies
- Salivary Gland disorders
### Laser use in Larynx
- Phonosurgery
- Improve Swallowing
- Laser Treatment of Airway Stenosis
- Tumors

### Laser Use in Upper Aerodigestive Tract
- Glottic Carcinoma
- Supraglottic Laryngeal Carcinoma
- Hypopharyngeal Carcinoma
- Oral and Oropharyngeal Carcinoma
- Palliative laser treatment of Head/Neck Cancers

### Laser use in Dermatology
- Cutaneous Vascular Lesions
- Benign Tumors
- Premalignant and Malignant Lesions
- Esthetic Laser Treatments

### Laser use in the future
- Good question.
- Just as 50 years ago, Lasers remain a solution to things not thought of today.
- Product development for new applications continues to expand.

### What Benefits does Laser Assisted Turbinoplasty have?
- LESS PAIN
- SAFER THAN THE CONVENTIONAL METHODS
- WELL DEFINED SHAPING OF THE TURBINATES (3D RECONSTRUCTION)
- PRESERVING THE FUNCTION OF THE MUCOSA
- MINIMAL TRAUMA TO THE MUCOSA STRUCTURE
- NO EXTENSIVE NASAL PACKING NEEDED POST SURGERY
- LOW INCIDENCE OF EXTREME NASAL PASSAGE DRYING (ATROPHIC RHINITIS) OR EMPTY NOSE SYNDROME
- REDUCE SIGNIFICANT NASAL ALLERGY SYMPTOMS
- LESS USAGE OF ANTIHISTAMINE OR NASAL SPRAYS POST SURGERY
- LESS BLEEDING COMPARED TO CONVENTIONAL METHODS

### What Benefit does Laser Assisted Adenoidectomy have?
- LESS PAIN
- PRECISE PROCEDURE WITH DIRECT VISION USING ENDOSCOPE AND CAMERA
- FASTER RECOVERY
- SAFER
- WELL DEFINED REMOVAL OF ADENOID WITHOUT ACCIDENTAL INJURY TO THE CERVICAL VERTEBRAE OR SURROUNDING VITAL STRUCTURES
- PARTIAL REMOVAL OF ADENOID FOR RECURRENT EUSTACHIAN TUBE OBSTRUCTION
- LESS BLEEDING
- LESS INCIDENCE OF PHARYNGEAL STENOSIS
- LESS INCIDENCE OF EUSTACHIAN TUBE INJURY

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• Questions

• Thank You