CryoRay: Novel Top-Down Intralesional Cryotherapy Microneedle Device JOHNS HOPKINS Members: Alana Yee, Harrsha Kumar, Helen Wang, Alice Yu, Maanya Bajaj, Brandon Chong, BIOMEDICAL ENGINEERING

Minh Pham, Sindhu Gokaraju Faculty Mentor: Michelle Zwernemann; Teaching Assistant: Unnathi Shashikumar Clinical Mentors: Dr. Andrew Tadros, Dr. Jihad Alhariri, Dr. Elise Ng, Dr. Sashank Reddy

Clinical Background



Problem: Lesion Recurrence

Recurrence Rates of Current Treatment Methods:



Need

Dermatologists need a less invasive method to flatten keloids in order to prevent lesion recurrence caused by additional skin trauma.



Cost Effective

Must Have Needs:



Non-Invasive

Keloids form when there is excessive production of collagen during the wound-healing process after skin trauma. Unlike typical scars that flatten over time, keloids persist as raised, thickened patches of skin that extend beyond the original wound boundary.¹

Current methods to treat keloids cause additional skin trauma, leading to the same excessive production of collagen and recurrence of keloids 4-6 months after treatment.⁵

Keloids affect approximately 150 - 300 million people globally.⁶

Liquid nitrogen is A topical anesthetic Patient arrives at sprayed at the lesion clinic with keloid is applied for ~30 seconds





- Temperatures 2mm away from needle show high cooling properties • Cooling properties decrease as distance from needle increases



Implements into existing workflow



Flattens Keloid

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Current Workflow: Spray Cryotherapy

Our Innovation

Features:

- Tubing and cryogun attachment
- Novel venting mechanism with same side insertion
- Small scale and minimally invasive
- Future direction: multi-needle array



Testing Results:

References

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