

An Illuminating Bite Block for Improving Oral Care in Developing Nations

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Executive Summary

In Nicaragua, community members do not have regular access to health or dental care. Global Brigades thus implements free medical clinics in these areas. Three members of our team travelled with Global Brigades and observed lack of stable power sources for dentists performing procedures in rural settings. These **primary problems are that:**

- Dentists have poor control over lighting
- Patients must strain themselves to open their mouths, causing fatigue and discomfort

Our team has designed an alternative product, the **Lite Bite**, that solves these issues by:

- Providing a stable and direct light source
- Propping open the patient's mouth at a safe and comfortable angle

Primary strengths of our products are that it is:

- Effective
- Affordable
- Compact
- Easy to use and sterilize

Clinical Need

- Only 58% of Nicaraguans have access to electricity
- 60% of procedures involve tooth extractions for which better lighting is needed



Figure 1: Tooth decay in an average Nicaraguan Child

Description of Market

- Our product is made for dentists who provide care to developing countries such as Nicaragua
- Our target market is nonprofit organizations such as Global Brigades
 - Global Brigades serves 400,000 patients and provides 2,000 dentists a year
- Additionally, we plan to distribute our product to other nonprofit organizations such as the Red Cross, which will be able to distribute our product to other organizations

Description of Design



Figure 2A: Top View of Lite Bite

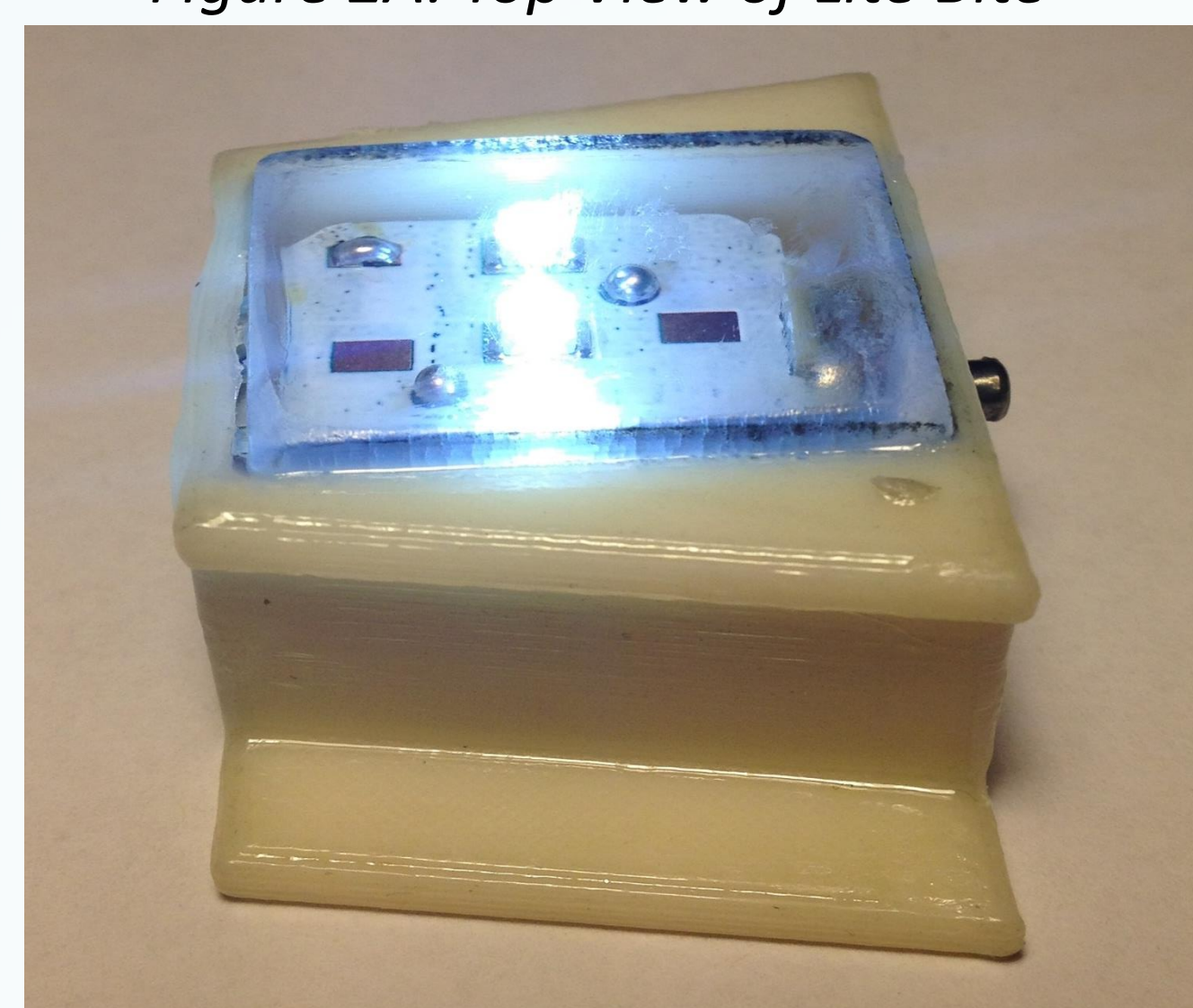


Figure 2B: Side View of Lite Bite

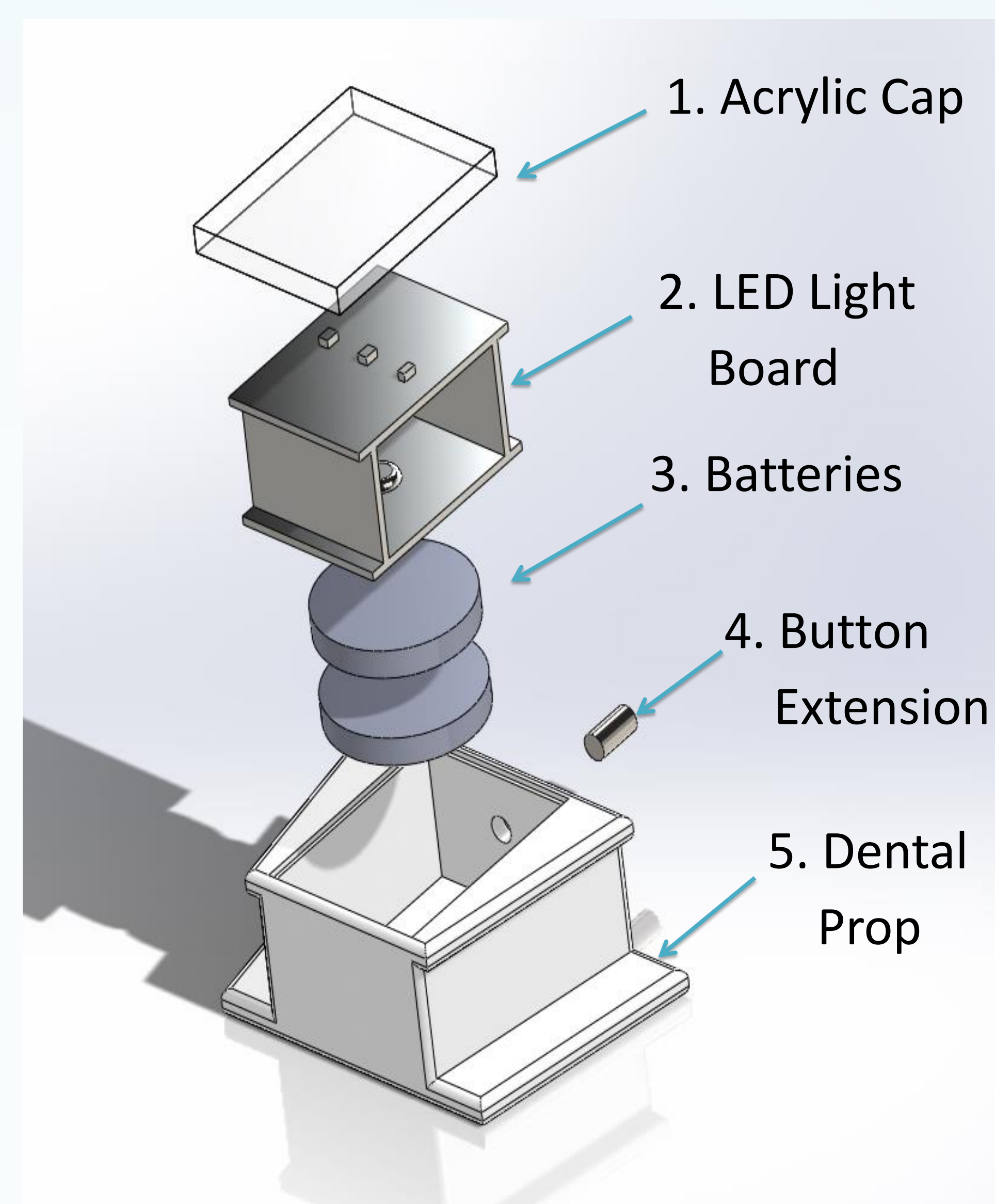


Figure 3: Exploded View of Lite Bite Model

1. Acrylic Cap

- A clear covering made of acrylic plastic provides a barrier between the light source and the patient's mouth

2. LED Light Board

- A circuit board consisting of three surface-mounted LED lights and circuitry provides light

3. Batteries

- Two disposable CR2032 coin batteries are the power source
- The battery life is about 8 hours, which means that each dental device has a lifespan of about one week

4. Button Extension

- The internal electronics of the Lite Bite can be easily switched on and off by pushing the metal rod

5. Dental Prop

- The dental prop is the bulk of our device keeps the patient's mouth comfortably open
- The dental prop is made of ABS plastic and waterproofed in acrylic dental resin for easy sterilization following each use

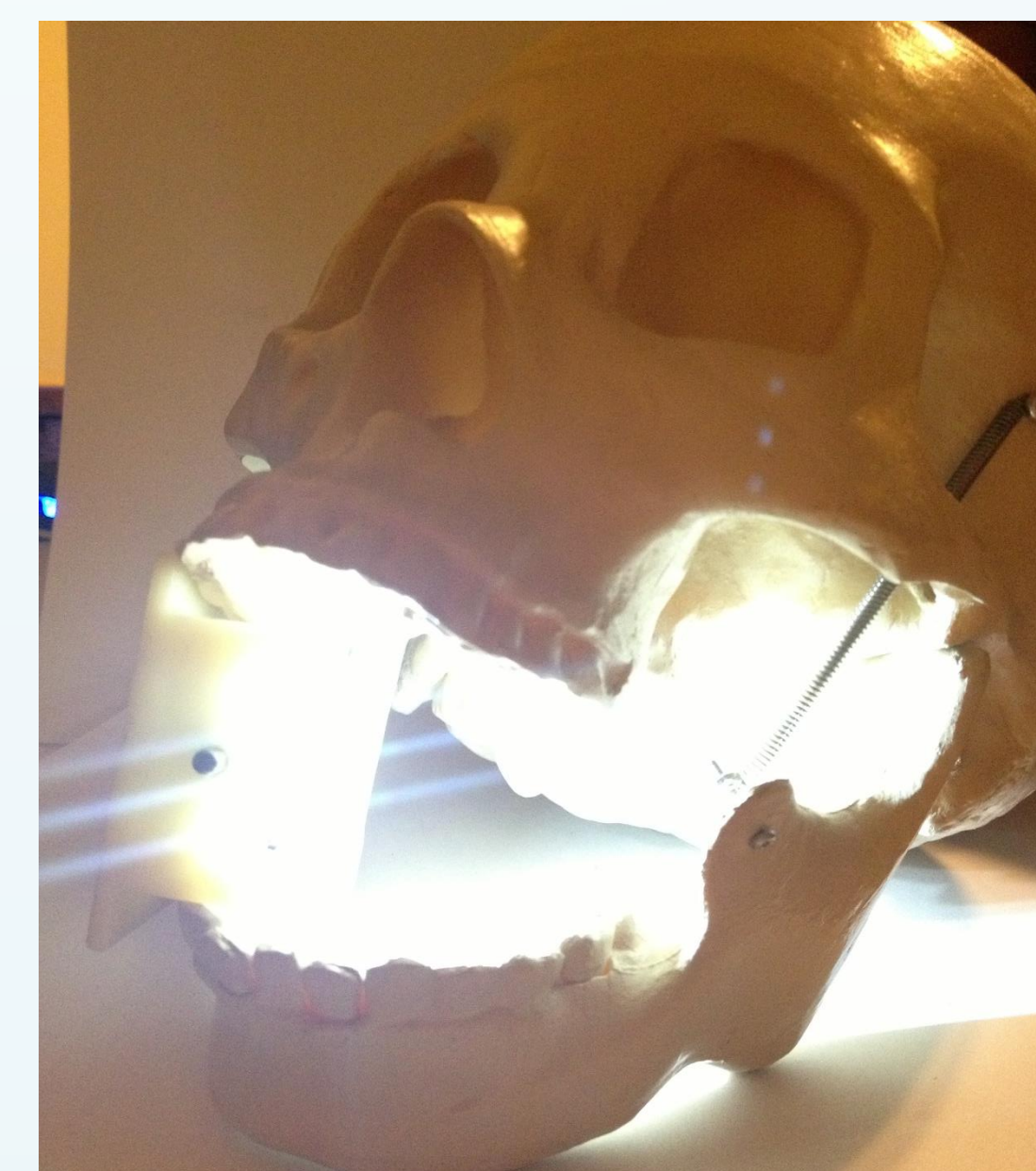


Figure 4: Comparison of Light Intensity with and without the Device

Novelty

- Has higher lighting performance than the standard headlamp or flashlight
- Provides a novel and compact method to deliver light effectively
- Cheaper than other lighting alternatives

Estimated Cost

Part	Amount per Unit (#/unit)	Bulk Cost (\$/#)	Cost per Unit (\$/unit)
ABS Prop	1	\$0.69/part (for 100,000)	\$0.69
ABS Cap	1	\$0.53/part (for 100,000)	\$0.53
LED Lights and Circuit board	1	\$0.50/part	\$0.50
CR2032 Battery	2	\$0.03/part	\$0.06
Acrylic Cover	1 g	\$10/kg	\$0.01
Total Material Cost			\$1.79
Labor	6 minutes	\$7.25/hour	\$0.73
Total Cost			\$2.52

Regulatory Pathway

- We will not seek FDA approval because we plan to sell the product in developing nations (a 501(k) application would be pursued if sold in the US)
- We will seek approval from respective regulatory bodies in: Nicaragua, China, and additional Latin American Countries

Future Directions

- Design refinements will be made in Q3 of 2013
- Clinical trials will continue in Q4; we have already obtained IRB approval
- We plan to begin manufacture and distribution of our product in China by Q2 2014 for the Red Cross

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