

## Licensing and Technology Transfer Opportunity

### 1. **Title of Technology Available:** A Full Mouth Rotary Bristle Tooth Brushing Assembly

### 2. **Brief Description of Invention:**

The present invention is generally related to dental and oral hygiene field. It is a brushing assembly with rotary bristles with motor and gear assembly for cleaning full mouth. It is made of dental trays with **unique arrangement** of bristles in a form of **miniature rollers** for cleaning of multiple teeth along with the **interdental areas**. The present invention is battery operated and does not need manual dexterity required for normal brushing which makes it very useful for the disabled, mentally challenged and bed-ridden people.

### 3. **Brief Background of Invention:**

Maintaining a good oral hygiene is the cornerstone of any dental treatment. Brushing the teeth removes plaque and reduces decay. The traditional teeth cleaning devices are manual toothbrushes. Geriatric (Old) population, physically and mentally challenged, people suffering from neuro-muscular diseases like Parkinsonism, bed-ridden patients, Chronically/terminally ill patients are unable to effectively brush their teeth using this manual approach. The currently existing devices are bulky and difficult to use. Hence, there is a need for a system which is motorised, less bulky and efficient.

### 4. **Describe the final product:**

The rotary bristle tooth brush assembly includes a mouthpiece and a motor. The mouthpiece comprises an **upper tray** and a **lower tray** designed in the shape of a gothic arch or a parabolic arch design and includes many circular brush heads and a gear mechanism. The upper tray has multiple circular brush heads and comprises of **first handle**. A lower tray is mounted below the upper tray and comprises of a **second handle**. A **gear train assembly** is mounted on the lower tray which has many gear wheels mounted on the lower tray. A drive assembly is mounted on the handle of the upper tray which is operated to drive the gear train assembly to rotate each circular brush head. This circular motion clean an entire surface of teeth. The assembly reduces the time required for brushing each individual tooth.

The circular brush heads in the mouthpiece comprises of many central bristles and peripheral bristles that are uniquely designed for an effective cleaning. **The central bristles** are arranged concentrically to clean gingival sulcus and teeth surfaces. The **peripheral bristles** (outermost bristles) are inclined inwardly towards a centre so that they are configured to a shape of a tooth profile and are designed to progressively increase in height to adapt and cover all the surfaces of the tooth.

The **drive assembly** comprises an input power supply, a rectifier, a buck convertor, a battery, a step down convertor and a motor. The first handle and the second handle are aligned and coupled to form an **integrated handle** for receiving the drive assembly. The **motor** resides outside the mouthpiece and controls the rotary motion of brush inside the mouthpiece. The motor is configured to control the mouthpiece device and transfer power to the bristles in the mouthpiece device by driving the gear mechanism. **The gear mechanism** is positioned along an arch of the mouthpiece. The drive unit is coupled to the gear mechanism.

The circular brushes are easily replaced when the bristles wear out due to usage. A gear ratio is selected to reciprocate the direct drive to maintain balance between speed and torque. The handles projected from the lower tray and the upper tray are coupled together to receive and store a drive gear. The **drive gear** mounted with a shaft head is sandwiched between the handles of the upper tray and lower tray so that the shaft is projected out of the upper tray to couple with a drive motor. AC main supply is fed to a rectifier to generate a DC supply which is input to a buck converter which is step-down transformer to reduce the voltage of a DC supply.

### 5. **Technological Domain (Keywords):**

Oral Hygiene, Rotary Bristle Brush, Parkinsonism, Geriatric, Tray assembly, Gear Mechanism.

### 6. **Proof of Concept:**

**Define:** The present invention is our latest innovative product targeting the general population but, is specially designed for disabled, mentally challenged and bedridden patients. It is simple to use, light to carry around while travelling, easy to clean and above all, a very efficient in teeth cleaning.

**Target population:**

- Geriatric (Old) population, Physically and mentally challenged, Blind
- People suffering from neuro-muscular diseases like Parkinsonism.
- Patients who are bed-ridden or are chronically/terminally ill.
- Dental hospitals and colleges, Private dental clinics, General public

**Need of innovation/Social Impact:**

- Improved oral hygiene, improved nutritional status.
- Longer tooth retention, Psychological trauma is less, Overall quality of life improved.

**Preliminary Survey:** A preliminary survey was done among Geriatric patients of KMC, Manipal, Karnataka in 2017 and it was concluded that Oral hygiene maintenance is difficult for old patients and currently they have no access to/knowledge of any such device to help them through.

**Design:**

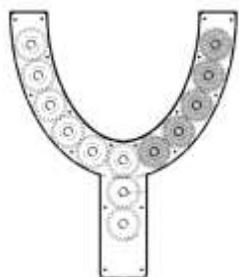


Fig 1: Tray with Gear Assembly

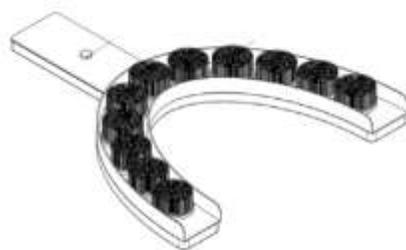


Fig 2: Tray with Bristles attached to Gears



Fig 3: Single Bristle unit

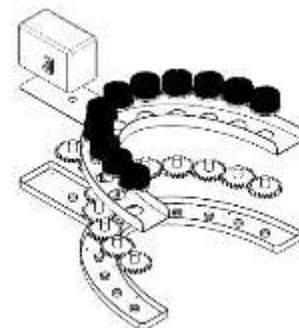


Fig 4: Complete Assembly

**7. Stage of Development:**

Initial/crude Prototype

**8. What are the unique advantages your innovation has compared to the competition?**

- a) Ability to brush multiple teeth at the same time.
- b) No manual skill nor dexterity required.
- c) Net brushing time is decreased
- d) Portable and easy to use.
- e) Comes in a protective case. Has a longer shelf-life than the conventional brushes.
- f) Bristles can be replaced on wearing.

**9. A few potential companies who might be interested in this technology:**

- a) Colgate
- b) Oral B
- c) Pepsodent
- d) Signal
- e) Crest
- f) Philips, Braun

**10. Intellectual Property Status: Indian Patent application with number 201741006220 filed in 2017**