

**“Propolis”- A Promising Medicament in Dentistry****Kavita A Madan<sup>1</sup>, Sachin Khatri<sup>2</sup>, Sudhindra Baliga M<sup>3</sup>**

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**ABSTRACT:**

Natural products or byproducts have always been considered as the safest medicament for humans especially for treating the diseases. Propolis, a resinous honey bee extract is one of such medicament which has proven itself to be successful in many parts of dentistry. The main reason behind its success is based on its antimicrobial, anti-inflammatory and immunomodulating capacity. This paper provides an overview of different applications and uses of propolis in the field of dentistry.

**Keywords:** Dentistry, Hazards, Propolis, Dental caries, Pulpotomy.

**INTRODUCTION**

In the present 21<sup>st</sup> century, there is a greater shift from the use of the conventional materials to the use of the naturally available medicaments for successfully curing the diseases.<sup>1</sup> Propolis is one of a naturally available material which has proven itself to be successful in medicine as well as dentistry. It is also known as bee glue which is a mixture of honeybees secretions from hypopharyngeal glands with the digestive products of resin that is collected by leaves, flowers of plants and trees thereby giving a final product which is a resinous and sticky in nature.<sup>2</sup> Not all kind of the species of honey bee can successfully produce propolis. *Apis mellifera* bee is involved in the production of propolis.<sup>3,4</sup> Propolis is derived from a greek work Pro-for/in defence and Polis- defence of the city(hive). As the material is very sticky it further prevents any external guests to enter the bee hive thereby protecting them against rodents, insects etc. In medical and dental fields, propolis has been successfully used for its anti-inflammatory, immunomodulatory and antibiotic properties.<sup>5</sup> It destroy fungi and viruses and inhibit the growth of viruses as well.<sup>5</sup> Propolis has a history long back from

the period of Egyptians and Greek civilizations where it had proven to be a successful agent in healing of the wounds. Hippocrates, the founder of modern medicine, used it for healing sores and ulcers internally and externally.<sup>1</sup>

Propolis is mainly composed of many different chemicals which may vary according to the climatic conditions and the plant/ tree from where it is collected. It is composed of resin and balsams (50% - 70%), essential oils and wax (30% - 50%), pollen (5% - 10%) and other constituents which are amino acids, minerals, vitamins A, B complex, E and the highly active bio-chemical substance known as bioflavonoid (Vitamin P), phenols and aromatic compounds. It is composed of few chemical classes amongst which the most important classes are flavonoids, phenolics and other various aromatic compounds. Flavonoids and caffeic acid present in propolis holds a very important part in the reduction of any inflammatory response by inhibiting lipoxygenase pathway of arachidonic acid. They also aid in the immune system by promoting phagocytic activities and stimulating cellular immunity. Flavinoids such

as quercetin, pinocembrin, galangin, pinobanksin are known to be antibacterial in nature. They are chiefly composed of histamine and serotonin which fight against allergies. A very dynamic and an important substance present in propolis is Caffeic Acid Phenethyl Ester also called as CAPE which has antioxidant, anti-inflammatory properties.<sup>6</sup> The chemical formula of propolis is not fixed as the percentage of each ingredients may vary depending on the location, climatic conditions, the species involved in the production, seasonal variations etc.<sup>2</sup>

### USES OF PROPOLIS IN DENTISTRY

Propolis being a biocompatible material of natural origin has been used in many areas of dentistry owing to its anti-inflammatory, anti microbial and immunomodulatory functions

**1. In pediatric dentistry:** pediatric patients are likely to be susceptible to many manmade drugs available in the market. Propolis being a natural product can be an effective alternative and can be safely used in these patients.

- **Pulpotomy** is a treatment of choice for the Cariously involved primary molars. Whichever material is being used for the procedure, its success mainly depends upon how the material is able to form an impervious hard tissue barrier so as to maintain the radicular pulp healthy. Prevention of microleakage is a key for the success of a pulpotomy (vital pulp therapy) procedure. A study conducted by Ozorio et al evaluated the histological features of the pulp tissue in primary pig teeth submitted to pulpotomy and capped with calcium hydroxide-base paste and standardized propolis extract-base paste and the combination of these pastes. It was concluded from the study that calcium hydroxide and standardized propolis extract favored the formation of a hard tissue barrier in primary pig teeth.<sup>7</sup>

- **Storage media-** avulsion or the total displacement of the tooth out of the socket is one of the most common injuries amongst the pediatric age groups and it accounts for about 0.5-16% of all the traumatic injuries to the

permanent dentition.<sup>8</sup> In a study conducted by Martin MP et al concluded that when propolis was used as a storage media, the viability of PDL cells were much higher than that compared with HBSS(Hank's balanced salt solution) milk, or saline.<sup>9</sup> Another study carried out by Ahangari et al recommended propolis as a suitable biologic storage media for avulsed primary teeth.<sup>10</sup>

- **DPC or Direct Pulp Cap:** It is a procedure which involves placement of a biocompatible medicament on the pulp tissue so as to seal the underlying pulp from bacterial contaminants thereby maintaining it in a healthy state. Propolis has been proven to be useful as a DPC agent. Parolia A et al in the study compared propolis with MTA and Ca(OH)<sub>2</sub> / Dycal and showed a similar bridge formation when compared to dycal.<sup>11</sup>

### 2. Periodontology

- **As a mouthwash:** due to its analgesic and anti-inflammatory property, propolis has been found to be a superior mouthwash. It aid in treatment of buccal surgical wound.<sup>12,13</sup>

Dodwad et al conducted a study to investigate the effectiveness of propolis containing mouth rinse in inhibition of plaque formation and concluded that propolis might be used as a natural mouthwash. Propolis significantly lowers halitosis upto 60% when combined with zinc gluconate.<sup>14</sup>

### 3. Endodontis:

**Anti-cariogenic effect:** Dental caries has been long recognized as an infectious disease requiring a susceptible host, cariogenic microflora and a diet high in refined carbohydrate to sustain that flora. The main microorganism involved is S.Mutans and Lactobacillus. Microorganisms gets attached to the tooth surface with the help of Glucans which is produced mainly by S.Mutans through GTF i.e glucosyltransferase. Propolis affects the activity of GTF along with the inhibition of S.Mutans.<sup>5</sup> Many studies have also concluded that caries prevention is achieved owing to the antimicrobial activity of

propolis. A study conducted by Tulsani et al comparing the anticariogenic action of propolis and Xylitol chewing gum on S.Mutans count concluded that Propolis chewing gum can be used as an anticariogenic agent in children.<sup>15</sup>

**As intracanal medicament:** Propolis has gained attention as an intracanal medicament in the field of endodontics due to its antibacterial, antiviral and antifungal properties. Propolis was found to be successful in killing E.faecalis from the canals which is the main cause for the failure of the root canal treatment.<sup>16</sup> This was in accordance with the study conducted by Oncag et al who have suggested propolis to be used in endodontics.<sup>17</sup>

**As bioactive material:** Calcium hydroxide has been successfully used as a pulp capping agent in dentistry and was found to be successful in secondary dentin formation. Propolis have also proven itself to have an added advantage over calcium hydroxide as vital pulp capping agent. This material also induced production of tubular and high quality dentin along with no pulp inflammation, infection or necrosis in guinea pigs.<sup>18</sup>

**4.Oral and maxillofacial surgery:** Oral cancer has a poor prognosis amongst all the other cancers. Orsolice et al. in his experimental study concluded that caffeic acid, CAPE, and quercetin present in propolis useful to limit and control the tumor cell growth.<sup>19</sup> CAPE was suggested as the main substance contributing for the antitumor activity along with cytotoxic effect on tumor cells. All this contribute to inhibition of proteins, DNA and RNA in tumor cells.<sup>2</sup>

**Concerns regarding propolis:** Propolis being a natural product is comparatively safe than other products. Some individuals are allergic to propolis the main reason attributed is the presence of caffeic acids.<sup>3</sup> Individuals are allergic to pollens or bee stings or are asthmatic are at a higher risk. Propolis is avoided to be used in pregnant ladies or those

who are breastfeeding.<sup>20</sup> Allergic reactions in the form of contact psoriasis, cheilitis, contact stomatitis, mouth sores, perioral eczema, labial edema.<sup>21,22</sup>

## CONCLUSION

With such a wide range of uses of propolis in dentistry, in the future time it would be one of the most promising medicament. Propolis being a natural substance is easy to use and is patient friendly. Further extensive studies for propolis need to be carried out for knowing its success rates.

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