

Apis mellifera: A natural remedy in dentistry.

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ABSTRACT

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Propolis (bee glue) is a sticky dark-coloured material that honey bees collect from living plants, mix it with wax and use it in the construction and adaptation of their nests, mainly to fill out cracks in the bee hive. It has been used in folk medicine since ancient times, and is now known to be natural medicine with, antibacterial, antifungal, antitumoral, antioxidant, immunomodulatory properties. These therapeutic properties of propolis have been motivating isolation researches, identification of chemical compounds, and the possible relationship of these with its biological activity. It has been used in dentistry for surgical wound healing, root canal treatment, pulp capping and tooth hypersensitivity. Propolis has a promising role in future medicine. This article reviews the clinical application of propolis as a natural medicine in dentistry.

Introduction

Propolis is derived from the Greek word "pro" before polis city or defender of the city. Propolis is the glue that honey bees (Apis mellifera) use to seal up their hives. Propolis has been known as natural medicine from ancient times. It has been used both locally & systematically for treating different diseases and inflammatory conditions. Propolis has dental & medical uses esp anaesthetic, antibacterial, antibiotic, antifungal, antiviral & antioxidant properties. [1]

It is often called the 'Russian Penicilli'. Flavanoids, aromatic acid, diterpenic acids and phenolic compound appear to be the principal components responsible for the biological action of propolis. It prevents bacterial cell division and also breaks down the bacterial cell wall and cytoplasm. It has shown to inhibit the growth of periodontopathogens (Actinomyces actinomycetemcomitans, fusobacterium, black pigmented bacteroides). Antibacterial action of propolis is more pronounced against gram positive bacteria than gram negative. [2] Current research involving propolis in dentistry spans many fields and highlights its antimicrobial and anti-inflammatory activities, particularly in cariology, oral surgery, pathology, Periodontics, Pedodontics and Endodontics. [3] The aim of this review is to draw the attention of all dental practitioners to propolis as a natural remedy and its possible use in dental diseases.

History

Propolis was used at the time of Egyptians and Greek civilizations. The Greeks recognized its healing qualities. The Greek physician, Hippocrates (460-377 BC), who is considered to be the father of modern medicine, recognized the healing properties of propolis. He

prescribed propolis for different types of ailments. [1] The medical community in the West only took notice in the 1960s and 1970s after the works of Lund A in Denmark and Chauvin R in France were published. [4] Propolis has been a traditional treatment for dental problems for hundreds of years. Because of this and its effect, it has become one of the most popular areas of clinical research in both East and West.

In 1980, a study showed patients with gingivitis and periodontal disease showed significant improvement using a propolis mouthwash (Schmidt). In 1983, Romanian researchers successfully treated Gingivitis with a Propolis product, similarly Cuban researchers and German found propolis to be a useful adjunct to oral hygiene. In 1987 a study in Yugoslavia showed propolis increased the blood flow to the pulp, and in 1988 work in Czechoslovakia illustrated that propolis both reduced inflammation and stimulated the healing process.

Studies in Russia in 1990 recommended the use of propolis in root canal fillings because of its anaesthetic and bone regenerating property. In the same year a Romanian study showed propolis to be effective as a pulp capping agent, increasing the production of dentine and remineralisation. In 1991 in Japan, propolis was shown to have an effect on reducing caries, and as recently as November 2004 (The Times Supplement, 6 November) it was reported that researchers in the University of Rochester Medical centre in New York State found propolis can stop the bacteria responsible for dental caries-S. Mutans. [5]

Composition

Propolis is a natural extract that honeybees collect from tree buds. The main chemical class present are Flavonoids, phenolics and

various aromatic compounds.[6] It is composed of resin(55%),essential oils & wax (30%) mixed with bee glue(the salivary secretions of bees) and pollen (5%)and other constituents(10%) which are aminoacids, minerals, ethanol(alcohol) Vitamins A, B complex, E and the highly active bio-chemical substance known as bioflavonoid. It also has a prime source of histamine and serotonin being substances needed to help the body cope with allergies.[1]

Clinical Applications in Dentistry

- 1) Antibacterial effect -Steinger et al demonstrated an in vitro antibacterial effect of propolis on both isolated oral streptococci and salivary bacterial counts in the clinical study.[7]. Ikeno et al studied the effect of propolis on growth and glucosyltransferase activity of *Streptococcus mutans* and *Streptococcus* circuits in vitro and suggested that propolis could control dental caries in rats.[8] Koo et al in Brazil found antibacterial effect of propolis on *S.mutans*, *S.sangius* and *A. Neaslundi* in addition to inhibition of glucosultransferase.[9]
- 2) Repair of surgical wounds -Magro-Filho and de-Carvalho analyzed and found that mouth rinse containing propolis in aqueous alcohol solution aided repair of intrabuccal surgical wounds and exerted mild analgesic and anti inflammatory effects.[10]

- 3) Treatment of Root Canal and Periodontitis-Kosenko and Kosrish used 4% alcohol solution of bee glue as root canal filling material clinical & radiographic examinations to concluded that its anaesthetising effect preserved root canal, did not stain the crown and also promoted bone regeneration.[11]

Qathami HA conducted an in vitro pilot study to compare antimicrobial activity of propolis with of sodium Hypochlorite and indicated that the antimicrobial activity of propolis is equal to that of sodium Hypochlorite.[12]

Rezende GP et al evaluated antimicrobial activity of endodontic pastes with Propolis Extracts and calcium hydroxide and demonstrated that association between propolis and calcium hydroxide was effective in controlling dental infections in vitro.[3]

- 4) Treatment of dental sockets and skin wounds - Magro- Filho and de-Carvalho examined cutaneous wound healing and socket wound after tooth extraction in rats with topical application of either 10% hydro alcohol solution of Propolis and concluded that it accelerated oral epithelial repair after root extraction but had no effect on socket wound healing.[10]
- 5) Direct and Indirect dental pulp capping- Ardo Sabir compared zinc oxide base filler and propolis flavonoids as direct pulp capping agents in rats .They concluded that Propolis flavonoids may delay dental pulp inflammation and stimulate repair dentin 13.Lontia et al compared alcoholic solution of propolis and zinc oxide for both direct and Indirect pulp capping. The morphologic study of indirect capping showed that secondary dentin developed followed by sclerotic transformation of the pulp. In teeth with direct pulp capping a protective film develops

at the opening of pulp chamber followed by cicatrisation by fibrosis with a trend to remineralisation. No areas of pulpal degeneration were found.[14]

- 6) Effect on dentinal hypersensitivity - Mahmoud AS et al conducted an in vivo study on effect of propolis on dentinal hypersensitivity using visual analogue scale and concluded that propolis had a positive effect in the control of dentinal hypersensitivity. In vitro studies found that propolis occluded dentinal tubules in sound, periodontally involved and recession teeth specimens in both etched and unetched dentin.[1]
- 7) Storage medium for avulsed teeth -Martin & Pileggi, and Ozan et al found propolis to be a superior transport medium to HBSS or milk in terms of maintaining PDL viability after avulsion and storage. Gopikrishna V et al conducted a comparative study to evaluate potential as storage medium in maintaining PDL viability between coconut water, Propolis, HBSS and milk and found coconut water to be superior most followed by Propolis.[6]

Discussion

There is a great trend nowadays to use natural materials as cure for many diseases. Alternative medicine has made a lot of contributions to modern medical practice.[1]

Flavonoids are known to be antibacterial and anti-inflammatory while the other phenolic compounds and caffeic acid esters have powerful antioxidant properties, other derivatives in propolis are known to stimulate the immune system. They surround & seal viruses stimulating WBCs & lymphocytes into producing interferon hence stimulating immune system. A very active ingredient is CAPE: caffeic acid phenethyl ester, with antiinflammatory, antimutagenic, antioxidant cystostatic and anti-cancer activities. The flavonoids in propolis contain very potent inhibitors of eicosanoid production, which strongly affect the immune and inflammatory response. However it is believed that no single ingredient is predominantly active rather all work together as a holistic product.

Propolis could also be an alternative to traditional antifungal & antiviral treatments. It can be tried at home as well as in the surgery, for sore throats (use propolis and Echinacea throat spray), burns and cuts (tincture and cream), cracked and chapped lips (propolis lip balm), athletes foot and other fungal infections, wicklows (tincture and cream).. Propolis is particularly effective in treating mouth ulcerations both aphous and traumatic. Propolis toothpaste is useful for periodontal patients and hypersensitivity. Propolis tincture is excellent in treatment for oral ulcerations of the aphthous type, denture trauma, and herpetic and non-specific painful oral ulcerations.

Propolis has a slightly anaesthetic effect. Propolis tincture is most useful as it can be applied to areas where other preparation are not so effective in staying in place .Allergy and sensitivity to propolis is uncommon but patients should be asked about adverse reactions to bee stings, allergies to bee products, honey and sensitivity to pollen, particularly if they are taking propolis systemically.[5]

Conclusion

A good deal of research data on the effect of Propolis has come from Eastern Europe where Propolis has been used as a natural medicine and where it is still being used routinely in medicine practice. These literature data are being published mostly in Russian, Polish, Roman, Slovak, German, Bulgarian and Chinese Languages. There is a need for further human and animal trial of this natural remedy in oral diseases. In conclusion, Propolis is a natural medication with a promising future but further studies should be conducted to investigate its merit and demerits in clinical dentistry.

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