The ABC’s of Cannabinoids & The Dental Effects

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https://youtu.be/2PLC_cBJwk4
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- Cannabis is the most widely available and used drug across the world
- Approximately 4% of the global adult population has used some form of cannabis in their lifetime
- In the US alone, approx. 11% of the adult population (36 million) have used cannabis or a derivative at least once
The Endocannabinoid System

The endocannabinoid system is a unique communications system found in the brain and body that affects many important functions. It’s made up of natural molecules known as cannabinoids, and the pathways they interact with. Together, these parts work to regulate a number of activities, including mood, memory, sleep and appetite.
What are cannabinoids?

The word cannabinoid refers to every chemical substance, regardless of structure or origin, that joins the cannabinoid receptors of the body and brain and that have similar effects to those produced by the Cannabis Sativa plant.¹

The types of cannabinoids that people use are for recreational or medicinal and are either organic or synthetic.

Research has found that the cannabis plant produces between 80 and 100 cannabinoids and about 300 non-cannabinoid chemicals.¹ The two main cannabinoids are delta-9-tetrahydrocannabinol (THC) and cannabidiol (CBD).
What are cannabinoids? (cont’d)

The most commonly known of the two is delta-9-tetrahydrocannabinol (THC), which is the chemical that is responsible for the psychoactive effects of cannabis.²

The main difference between the two cannabinoids is that THC has strong psychoactive effects, meaning it makes a person ‘high’, whereas CBD is thought to have an anti-psychoactive effect that controls or moderates the ‘high’ caused by the THC. CBD is also thought to reduce some of the other negative effects that people can experience from THC, such as anxiety.³
Cannabinoids come in many different forms, including:

● leaves, flowers (buds)
● capsules
● edibles (gummies, brownies etc.)
● creams/lotions
● oils
● oro-mucosal sprays
● tinctures
What Is Cannabis?

The word “cannabis” refers to all products derived from the plant Cannabis sativa.

- **Marijuana** – the dried leaves and flowers (buds) of the cannabis plant that are smoked in a joint or a bong. This is the most common form.
- **Hashish** – the dried plant resin that is usually mixed with tobacco and smoked or added to foods and baked goods; such as cookies and brownies.
- **Hash oil** – liquid that is used sparingly (due to high potency) and added to the tip of a joint or cigarette and smoked.³
- **Concentrates** – extracts typically using butane hash oil as a solvent, often vaporised in small quantities due to high THC content.
Broadly speaking, medicinal cannabis is cannabis prescribed to relieve the symptoms of a medical condition, such as epilepsy.

It's important to note there's a difference between medicinal and non-medicinal cannabis. Non-medicinal cannabis is the form that people use to get 'high'.

For some people with chronic or terminal illnesses, conventional medicines don't work, or don't work as effectively as medicinal cannabis. Also, for some patients, conventional medicines may work but cause debilitating side effects that cannabis can help to relieve.
Types and forms of medicinal cannabis

There are three main forms of cannabis that can be used medicinally:

- Pharmaceutical cannabis products that are approved by an organization such as the Therapeutic Goods Administration (TGA), including nabiximols (Sativex®) and synthetic cannabinoids such as Dronabinol®. Sativex, which comes as a nasal or oral spray, has been approved in over 24 countries for treating spasticity due to multiple sclerosis.

- Controlled and standardised herbal cannabis (plant products), such as the products produced in the Netherlands.

- Unregulated and illegal herbal cannabis (plant products), which contains unknown concentrations of cannabinoids and potentially harmful impurities such as bacteria and mold (USA only).
What is Butane Hash Oil?

Dabs or dabbing are the names for the use of concentrated butane hash oil (or BHO). It is a relatively new method of administering/ingesting cannabis that involves the inhalation of highly concentrated tetrahydrocannabinol (THC), the main active chemical in cannabis. This concentrated form is produced through a chemical process using butane oil. Butane is used to extract the oils from the cannabis.

Reports suggest that butane hash oil can have a THC concentration of approximately 80% (in comparison with traditional cannabis which is about 10-25%).
Other Names for BHO

- Marijuana wax
- Budder
- Honeycomb
- Shatter
- Dab
- Amber
- Wax butter
- Sap
Synthetic cannabinoids (also referred to as synthetic cannabis) are a new psychoactive substance (NPS) that was originally designed to mimic or produce similar effects to cannabis. It has been sold online since 2004.

Synthetic cannabinoids are marketed under different brand names.

- Spice was the earliest in a series of synthetic cannabinoid products sold in many European countries. Since then a number of similar products have been developed, such as Kronic, Northern Lights, K2 and Kaos

- Synthetic cannabinoids can also be marketed as aphrodisiac tea, herbal incense and potpourri.
What do synthetic cannabinoids look like?

Synthetic cannabinoids are powdered chemicals that are usually mixed with solvents and sprayed onto herbs and sold in colourful, branded packets. The chemicals usually vary from batch to batch as manufacturers try to stay ahead of the law, so different packets can produce different effects even if the name and branding on the pack looks the same.
The effects of synthetic cannabinoids can include:

- relaxation
- euphoria
- loss of coordination
- fast and irregular heartbeat
- racing thoughts
- agitation, anxiety and paranoia
- psychosis
- aggressive and violent behaviour
- chest pain
- vomiting
- raised blood pressure (hypertension)
- breathing difficulties
- hyperthermia (overheating)
- breakdown of muscle tissue (rhabdomyolysis)
- acute kidney injury
- seizures
- stroke
- death.1, 6, 7
Set and Setting

Synthetic cannabinoids have varied effects depending on a person’s mood (often called the ‘set’) or the environment they are in (the ‘setting’):

Set: a person’s state of mind, previous encounters with psychoactive drugs, and expectations of what’s going to happen. For example, feelings of stress or anxiety before using synthetic cannabinoids can be magnified and result in an unpleasant experience.

Setting: the environment in which someone consumes synthetic cannabinoids – whether it’s known and familiar, who they’re with, if they’re indoors or outdoors, the type of music and light. For example, using synthetic cannabinoids in a calm, quiet and relaxed environment can lead to a pleasant experience but being in a noisy, crowded place may result in a negative experience.
What Is Cannabidiol (CBD)?

Cannabidiol, commonly known as CBD, is one of more than 100 cannabinoids (chemical substances) found in the cannabis plant.

CBD is usually an oil but can also be infused into gummies and edibles. Other forms include: pills/capsules, creams/lotions, ointments/balms, vape pens.
Effects Of CBD

The effects of CBD might include:

**Possible pain relief**: Studies suggest CBD may be helpful in reducing chronic pain and reducing inflammation. Symptoms of rheumatic diseases, such as fibromyalgia, may improve with CBD.

**Reduced anxiety**: Some symptoms of anxiety disorder have been shown to improve with CBD use.

**Relief from cancer treatment side effects**: Side effects related to cancer treatment (like vomiting and nausea) may be reduced with CBD.

**Treatment for seizures**: Seizures linked to various health conditions may be treated effectively with CBD. Epidiolex®, a prescription CBD product, has been listed on Australia’s Pharmaceutical Benefits Scheme (PBS) scheme for the treatment of seizures associated with Dravet syndrome – a severe form of epilepsy.

**Possible improvement in sleep**: CBD may help improve sleep in people with certain sleep disorders, however more research is needed.
EPIDIOLEX: A treatment innovation
EPIDIOLEX is the first and only FDA-approved prescription CBD used to treat seizures associated with Lennox-Gastaut syndrome (LGS), Dravet syndrome, or tuberous sclerosis complex (TSC) in patients 1 year of age and older.

EPIDIOLEX® (cannabidiol), the First FDA Approved CBD Drug
FDA Approved Synthetics - Medicinal

Examples of pharmaceutically manufactured cannabis-related/cannabis-derived drugs approved by the FDA include:

- Dronabinol, a synthetic form of THC commercially marketed as Marinol® (capsule) and Syndros® (oral solution)
- Nabilone, a synthetic drug with a chemical structure similar to THC commercially marketed as Cesamet®
Common reported side effects of CBD include:

- Diarrhea
- Drowsiness and fatigue
- Dry mouth
- Reduced appetite

**Long-term effects**
Further research into the long-term effects of CBD is needed, but early reports indicate there’s no long-term toxicity from CBD.10

**Tolerance and dependence**
CBD does not seem to have dependence-related effects.
Mixing CBD with other drugs

The effects of taking CBD with other drugs – including over-the-counter or prescribed medications – can be unpredictable and dangerous.

**CBD + alcohol or THC**: can increase drowsiness and sedation.11

**CBD + blood thinning medications (Warfin®)**: can cause higher levels of Warfin® to be present in the body, which may cause excess bleeding and haemorrhage.12

CBD and the law

Low dose CBD was recently changed from a Schedule 4 (prescription only) medicine to Schedule 3. This means you can access CBD products over the counter.13

Currently the Therapeutic Goods Administration (TGA) has not approved any CBD products and the process could take a number of years.13

However, a GP can write a prescription for CBD and they no longer need to apply to the TGA via the Special Access Scheme. It also means people can now access imported CBD products online or from a cannabis access clinic.13
Studies & Reviews of the Dental Effects of Cannabinoids
Several pieces of evidence from the Elverdin lab pointed out a negative action of both CB1 and CB2 receptor activation in the regulation of saliva secretion [89,90,91,92,93], which might explain the dry mouth sensation always experienced by heavy cannabis users [11].

Another target of cannabinoid-based medicine in the dental pulp might be dentin repair/regeneration. Indeed, functional CB1 receptors have also been reported in human odontoblasts [96]. Cannabinoid treatment of rat odontoblasts has been shown to promote the formation of “reparative dentin” by modulating extracellular Ca2+ entry [97], which might be the mechanism for CB1-mediated dental pulp tissue repair via the matrix metalloproteinase–2 activation in dental pulp cells [98,99,100,101,102].

In vitro, Liu et al. [104] reported that delta-9-tetrahydrocannabinol (THC) promoted periodontal cell adhesion and migration in wound tissue healing (Table 4).

Cannabis abuse has always been known to impact on proper oral health status. Several compounds assume that cannabis smoke will possibly put cannabis users to a higher risk of dry mouth, dental caries, soft tissue disease, poor oral hygiene, periodontal disease and even oral cancer by changing the physiology of the oral environment.
Conclusions: FRC use was associated with deeper probing depths, more clinical attachment loss and higher odds of having severe periodontitis.
Periodontal status in cannabis smokers. 
A systematic review

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**Conclusion**: Based on the available data, frequent cannabis smoking could be detrimental for periodontal tissues and this could be dose-dependent. Studies including long-term cannabis smokers, and stratified for Periodontal Diseases’ etiologic factors and risk factors/indicators are needed.
Cited from the ADA:

The following dental findings may indicate a chronic recreational cannabis user:2-4, 10, 37, 80, 81

Xerostomia
Leukoplakia
Periodontitis
Gingival enlargement/hyperplasia
Increased decayed, missing or filled teeth
Stomatitis
Candidiasis
Alveolar bone loss
Use of a Collagen Membrane Loaded With Recombinant Human Bone Morphogenetic Protein-2 With Collagen-Binding Domain for Vertical Guided Bone Regeneration

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Background: Vertical bone regeneration of severe atrophic alveolar ridges remains a challenging procedure in implant dentistry.

Methods: The aim of this study, accordingly, is to use a rabbit vertical guided bone regeneration model to evaluate whether using a collagen membrane (CM) loaded with small doses of recombinant human bone morphogenetic protein-2 with collagen-binding domain (rhBMP-2/CBD) would enhance two-way vertical bone regeneration. In each of eight rabbits, four titanium cylinders were screwed in perforated slits made into the external cortical bones of the calvaria. The following four treatment modalities were randomly allocated: 1) cylinders filled with mineralized bone matrix and covered with CM/rhBMP-2/CBD; 2) cylinders filled with mineralized bone matrix and covered with CM/rhBMP-2; 3) cylinders filled with mineralized bone matrix and covered with CM alone; or 4) cylinders filled with mineralized bone matrix without a membrane cover.
Results: After 6 weeks, the new bones were examined by histologic analysis. Slender new bone trabeculae were observed in the superficial layer of the titanium cylinders covered with CM/rhBMP-2/CBD, and higher degrees of bone were observed in this group compared with the other three groups. The average area fraction of newly formed bone was significantly more in the CM/rhBMP-2/CBD group compared with the CM/rhBMP-2, CM, or the no membrane control groups (all P <0.01).

Conclusions: The present study demonstrates that CMs loaded with small doses of rhBMP-2/CBD induce new bone formation not only from the surface of the native bone, but also from the superficial structures. The augmented new bone, therefore, is improved in both quantity and quality.
Questions, Comments, Concerns.....
Thank you for our 9th year of The North Charlotte Dental Hygiene Study Club!

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