

Potential Benefits of Curcumin in Oral Medicine

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What is Curcumin?

- Turmeric has been used in India for thousands of years, as a spice (curry) and also medicinally
- Curcumin is the main active component in turmeric that is responsible for the vibrant color; only 3% of turmeric's weight
- It is a fat-soluble compound and a powerful antioxidant that is widely known for its anti-inflammatory effects; chronic inflammation is linked to serious conditions, such as heart disease, Alzheimer's, cancer, and metabolic syndrome



<https://www.google.com/url?sa=i&url=https%3A%2F%2Fwww.medicalnewstoday.com%2Farticles%2F320732&psig=AQvVaw3WsjxI3bsMnhMJF1kRM-XE&ust=1585851178266000&source=images&cd=vfe&ved=0CAIQIRxqEwoTCND-ZPax-qCFQAAAAAdAAAAABAZ>



Why Curcumin?

- ❖ Alternative medicine and Ayurvedic practices have been growing in popularity for decades as people become more and more educated on adverse side effects of pharmaceuticals
- ❖ Many claims have been made that curcumin can treat diseases that are rooted in the inflammatory process: those previously mentioned, as well as arthritis and type 2 diabetes
 - A lot of research has been done in lab – we need more human trials
 - Curcumin is not very bioavailable by itself
- ❖ Quelling inflammation in the mouth is of utmost importance to prevent the breakdown of supporting structures that lead to periodontitis



For this analysis, we focused on 3 oral manifestations: Oral Lichen Planus (Candice), Periodontitis in diabetic patients (Luis), and Oral Leukoplakia (Courtney)

Curcumin in the Treatment of Oral Lichen Planus

- This study was a randomized double-blind placebo-controlled trial on the effectiveness of curcumin in the treatment of Oral Lichen Planus(OLP). It was published in the Journal Of Clinical and Diagnostic research on May 10.2016. It was conducted by Maryam A, Atesa Pakfetrat, Zahra D et al.
- The purpose of this study was to “study the efficacy of curcumin, which is a low molecular weight flavonoid with anti-inflammatory and antioxidant activities, in the treatment of OLP”.
- The study had 20 participants. They were chosen based on a pre-clinical screen for OLP. The twelve participants comprised the experimental group and the other eight the control group. The experimental group was given the curcumin tablet of 500mg and the control group eight were given a placebo tablets of lactose.
- The study was conducted over a four weeks period. Initial measurement was taken at the beginning and at two week intervals. The inflammation and pain was measured using the Visual Analogue Scale and the Thongpason Index. The researcher analyzes their statistical finding by using the Mann-Whitney and Independent test. They found a $p < 0.05$ between the two groups.



Curcumin in the treatment of Oral Lichen Planus

Lichen Planus



<https://www.mayoclinic.org/diseases-conditions/oral-lichen-planus/symptoms-causes/syc-20350869>


- The study resulted in no noticeable difference between the two groups in reduction of OLP symptoms.
- The researchers found, that the low dose of curcumin used in the study, was not effective in the treatment of OLP.
- In a previous study, researchers found that a higher dose was effective in treating OLP symptoms.
- The researchers suggested a high dose of curcumin and a different type of curcumin should be used in future studies that will ensure a better outcome.



Curcumin and Periodontitis in Patients with Type 2 DM

A study conducted in 2019, investigated the effects of antimicrobial photodynamic therapy using curcumin solution irrigation with LED irradiation on residual pockets in patients with type two diabetes. The following link can be used to find this article.

<https://doi.org/10.1016/j.pdpdt.2019.07.005>

- This study combined different methods with and without curcumin solution with all the other treatments.
- The different types of proposed treatments conducted among  participants were:
 - 1) Irrigation with curcumin solution
 - 2) Light emitted diode (LED) irradiation
 - 3) Scaling/root planing therapy (standard of care)
- This study consisted of four groups. Each group received a single session of scaling root planing. Group 1, however, only received scaling root planing and was considered the control group. Group 2 was treated with irrigation of curcumin solution. In addition to the single session of SRP, group 3 was treated with sixty seconds of irradiation and group 4 was treated with all the treatments proposed. The treatments were administered at three and six months.

Effects of Curcumin on The Treatment of Periodontitis.

The study found:

- ❑ reduction in probing depth and bleeding on probing in all treatment groups at 3 and 6 months period compared to baseline.
- ❑ Gingival recession remained the same in all groups.
- ❑ Clinical attachment level improved in the group that received all different type of treatments and in the group that received (LED) only at three months.
- ❑ Plaque index improved in all the groups at 3 and 6 months.

According to the findings of this study, one can determine that in patients with type 2 DM, the treatment of residual pockets can be treated with combined treatments. The combination of the different treatments can produce a short-term, 3 months, clinical benefit regarding residual periodontal pockets.



Table 2

Clinical outcomes at baseline, 3 and 6 months.

Groups	Baseline (M ± SD)	3 Months (M ± SD)	6 Months (M ± SD)
PD (mm)			
aPDT	5.71 ± 0.92	4.33 ± 1.78*	4.47 ± 1.40*
CUR	5.71 ± 0.74	4.41 ± 1.07†	4.68 ± 1.22*
SRP	5.67 ± 0.78	4.58 ± 1.24*	4.70 ± 1.37*
LED	5.61 ± 0.77	4.29 ± 1.19†	4.55 ± 1.33*
GR (mm)			
aPDT	1.30 ± 1.27	0.88 ± 1.18	1.30 ± 1.35
CUR	1.14 ± 1.32	1.19 ± 1.44	1.12 ± 1.35
SRP	0.99 ± 1.27	1.03 ± 1.33	0.79 ± 1.12
LED	1.43 ± 1.34	1.29 ± 1.20	1.37 ± 1.30
CAL (mm)			
aPDT	6.71 ± 1.85	4.95 ± 2.33†	5.46 ± 1.98
CUR	6.68 ± 1.86	5.42 ± 2.26	5.78 ± 2.17
SRP	6.63 ± 1.66	5.54 ± 2.19	5.44 ± 1.99
LED	6.85 ± 1.61	5.41 ± 1.98†	5.70 ± 1.88
BOP (%)			
aPDT	100	42.60 ± 44.23†	34.99 ± 40.33†
CUR	100	37.03 ± 39.38†	37.33 ± 36.06†
SRP	100	48.26 ± 38.53†	30.64 ± 34.50†
LED	100	35.38 ± 36.81†	39.32 ± 39.60†
PI (%)			
aPDT	68.24 ± 38.23	33.03 ± 43.52†	29.78 ± 41.18†
CUR	69.34 ± 38.44	31.57 ± 37.82†	34.06 ± 38.43†
SRP	75.61 ± 32.22	45.11 ± 42.14†	38.75 ± 40.22†
LED	64.53 ± 36.38	42.49 ± 44.16	34.70 ± 39.60†

PD probing depth; GR gingival recession; CAL clinical attachment level; BOP bleeding on probing; PI visible plaque index; aPDT antimicrobial photodynamic therapy; CUR curcumin; SRP scaling and root planing; LED light emitting diode; mm millimeter.

M ± SD mean and standard deviation.

* Significant intragroup difference from baseline by ANOVA test ($p < 0.05$).

† Significant intragroup difference from baseline by Friedman test ($p < 0.05$).

Curcumin and Oral Leukoplakia: A Double-Blind Trial



Oral Leukoplakia



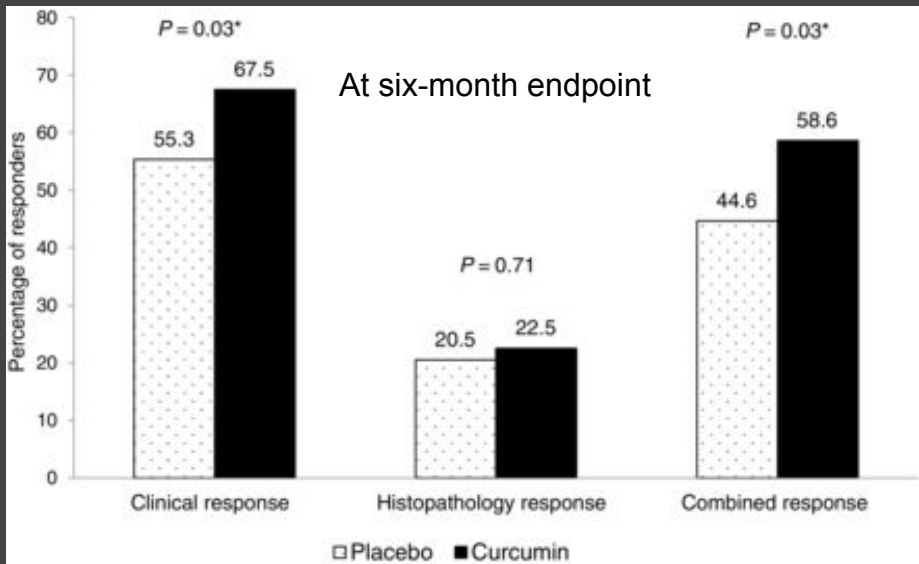
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- The purpose of this study was to test if orally administered curcumin is effective, as well as safe, in treating oral leukoplakia, a.k.a smoker's keratosis (precancerous lesion)
 - Participants were randomly chosen; 111 were placed in curcumin arm, and 112 were placed in placebo arm; they were observed over a 12-month period
 - 3.6g of curcumin was self-administered daily to the treatment arm by way of capsules (3-600mg capsules 2x/day), taken with food
 - The study included both clinical and histopathologic responses – measurements and biopsies were taken for baseline and follow-up comparisons
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- There were 2 endpoints in the trial - the first one at 6 months and the second at 12 months. All subjects were examined at both endpoints
 - Those who showed complete reversal (CR) after 6 months stopped treatment and were checked for relapse at 12 months. Those with partial reversal (PR) continued treatment for the full 12 months.

Curcumin and Oral Leukoplakia: A Double-Blind Trial



- The combined response, clinical and histologic, produced significant results that indicate curcumin is effective in treating oral leukoplakia
- This study showed no potential harm from 3.6g of oral curcumin



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Table 2.
Analysis of durability of clinical response at 12 months in patients who had CR or SD at 6 months (ITT population)

CR at 12 months compared with 6-month evaluation	Curcumin, N (%)	Placebo, N (%)
Patients with Clinical *CR at 6 months		
Durable response (*CR) at 12 months	16 (88.9)	7 (87.5)
Disease relapse (*PD at 12 months)	2 (11.1)	1 (12.5)
Missing	4	4
Patients with Clinical *SD at 6 months		
Durable response (*CR/*PR/*SD at 12 months)	7 (70.0)	14 (82.4)
Disease relapse (*PD at 12 months)	3 (30.0)	3 (17.6)
Missing	13	15

Abbreviations: *CR, complete response; *SD, stable disease; PD, progressive disease; *PR, partial response.

<https://cancerpreventionresearch.aacrjournals.org/content/9/8/683.figures-only>

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Curcumin in Dental Hygiene

- Curcumin has several claimed medicinal properties, including: antioxidant, antimicrobial, hepatoprotectant, immunostimulant, antiseptic and antimutagenic.
- In the dental hygiene profession, curcumin can also have a wide range of benefits in the treatment of many conditions. Although more research is needed, curcumin trials have already shown great potential in the field of dentistry .

Current uses:

1. Being use as a paste in treating gingivitis and periodontal disease
2. Treatment of oral cancer and precancerous lesion
3. Ease dental pain and reduce swelling
4. Can be used for subgingival irrigation
5. Anti-cavity treatment by bacteriostasis



Curcumin in Dental Hygiene

As dental hygienists, we should always be open to the efficacy of alternative medicine, as it is becoming increasingly popular. The polypyhenols in curcumin are effective in inhibiting the proliferation of microorganisms. Research on curcumin's potential in oral medicine should continue as it is our duty to stay informed so that we can offer our patients safe and effective products that meet all of their needs and preferences.

This presentation has demonstrated that curcumin has shown great promise to treat:

- + Oral Lichen Planus
 - Curcumin should be administered through capsules concentrated in high doses.
- + To reduce plaque, bleeding and improve CAL in patients with type 2 diabetes suffering from periodontitis
 - Curcumin should be administered through irrigation, and this method should be continued as part of the patient's daily routine.
- + Effective in treating oral leukoplakia
 - In order for curcumin to be effective in treating this condition, it should be administered in capsules containing at least 3.6 grams.



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