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[Review](#) [Acta Odontol Scand.](#) 2009;67(6):321-32. doi: 10.1080/00016350903160563.

Caries preventive effect of casein phosphopeptide-amorphous calcium phosphate (CPP-ACP): a meta-analysis

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Abstract

Objective: This systematic review with meta-analyses sought to answer the following question: "Does CPP-ACP [casein phosphopeptide-amorphous calcium phosphate], when introduced into the oral environment, provide any caries-preventive benefit superior to that of any other intervention or placebo?"

Material and methods: Seven electronic databases were searched for trials relevant to the review question. Twelve articles were accepted after application of inclusion and exclusion criteria.

Results: Of the accepted articles, five in situ randomized control trials (RCT) could be pooled for meta-analyses. During the short-term (7-21 days) in situ trials, participants wore appliances containing

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enamel slabs that were analyzed in the laboratory after exposure to CPP-ACP. The pooled in situ results showed a weighted mean difference (WMD) of the percentage remineralization scores in favor of chewing gum with 18.8 mg CPP-ACP as compared to chewing gum without CPP-ACP (WMD -8.01; 95% CI: -10.54 to -5.48; $p = 0.00001$), as well as compared to no intervention (WMD -13.56; 95% CI: -16.49 to -10.62; $p = 0.00001$). A significant higher remineralization effect was also observed after exposure to 10.0 mg CPP-ACP (-7.75; 95% CI: -9.84 to -5.66; $p = 0.00001$). One long-term in vivo RCT (24 months) with a large sample size ($n = 2720$) found that the odds of a tooth surface's progressing to caries was 18% less in subjects who chewed sugar-free gum containing 54 mg CPP-ACP than in control subjects who chewed gum without CPP-ACP ($p = 0.03$).

Conclusion: Within the limitations of this systematic review with meta-analysis, the results of the clinical in situ trials indicate a short-term remineralization effect of CPP-ACP. Additionally, the promising in vivo RCT results suggest a caries-preventing effect for long-term clinical CPP-ACP use. Further randomized control trials are needed in order to confirm these initial results in vivo.

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