Opuntia and Metabolic Control Among Patients with NIDDM
A Systematic Review and Meta-Analysis

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Surveys of NIDDM patients in South Texas suggest approximately 50% use traditional medicines as adjunct therapies. The most frequently cited traditional medicine of this predominantly Mexican-American population is nopal or prickly pear cactus (*Opuntia* sp.). Anecdotal reports of an increased use of a "cactus pill" have also been received. Knowledgeable of a few published studies of *Opuntia* and its effect in reducing serum glucose levels, a systematic review of this literature was conducted.

The objectives of this review were to answer three questions: First, what evidence exists either in support of or against the use of nopal by patients with NIDDM? Second, what is the effect on reducing serum glucose with different preparations of nopal, at different doses, and how soon after ingestion is the effect apparent? Third, what advice should clinicians give their patients regarding the use of nopal and the "cactus pill?"

We attempted to identify all relevant studies by searching MEDLINE, by using the bibliographies of published studies, and by contacting the authors of the studies. A total of 16 published studies were identified which had examined the effects of nopal in humans. Of these, 13 included NIDDM patients. Most studies used small sample sizes ranging from 6 to 24. The typical study design was cross-over where patients would be given a single dose of nopal (some studies had multiple treatment arms with varying amounts of nopal) and then water (sometimes zucchini) as a control. The nopal was administered to patients in various preparations including raw, broiled, whole, blended, the products after being centrifuged, and in capsular form with a dehydrated extract of raw nopal.

Most of the possible comparisons for these data included only single studies with multiple postingestion measurements. The comparison most amenable to meta-analysis was a single dose of 500 grams of broiled nopal which included 1 to 8 studies, which varied along 7 measurement times ranging from a half-hour to 6 hours post-ingestion. There were two studies of the "cactus pill". The meta-analysis was conducted using the pretest and post-test serum glucose means which were converted to standardized mean-difference-effect sizes.

The results of the meta-analysis of the 500-grams-broiled comparison indicates a statistically significant reduction of serum glucose, which stabilizes at 3 hours postingestion. The reduction at 3 hours was 0.95 effect size, which equates to a serum glucose reduction of 36.5 mg/dL (95% CI: 22.7 - 61.1 mg/dL). There was no reduction of serum glucose levels for patients using the "cactus pill." All comparisons were statistically homogeneous at an alpha of 0.10. These results suggest there is a serum glucose reduction effect when 500 grams of broiled nopal is eaten. Other

single-study comparisons seem to suggest a dose-response relationship exists and that heating may enhance this effect of nopal.

Additional research is required to determine optimal preparations and doses of nopal. More work is needed to identify the underlying mechanism if an effective "cactus pill" is to be produced. Meanwhile, clinicians should advise their patients that nopal should NOT replace their prescribed therapy but to use nopal as an dietary adjunct.