

Acceptance Program Guidelines

# Products for the Treatment of Dentinal Hypersensitivity

Council on Scientific Affairs

## Products for the Treatment of Dentinal Hypersensitivity

Scope:

These guidelines outline criteria used to evaluate products useful in the reduction, elimination or prevention of dentinal hypersensitivity. The products may be either professionally or patient applied. Products evaluated using these guidelines include tooth-pastes that contain ingredients which are thought either to obdurate dentinal tubules or to alter the physiologic properties of dentinal fluid, for example. Other product examples would be materials professionally applied to affected areas that obdurate dentinal tubules. Products containing fluoride must also satisfy the appropriate Council requirements.

## I. SUBMISSION DIRECTIONS

### 1. General Information

- A Submissions are to be sent to the Council Office:  
**Director, Product Evaluations**  
**Council on Scientific Affairs**  
**American Dental Association**  
**211 East Chicago Avenue**  
**Chicago, Illinois 60611-2678**
- B Submissions are to be sent in triplicate, along with one single-sided copy for duplicating purposes. Three samples of each product from different lots shall be provided. Market samples are preferred. If possible, the submission should be less than 200 pages exclusive of appendices.
- C A manufacturer is advised that the review process is complex. Typically, notification of Council action may be expected 90 to 150 days from the receipt of a *complete* submission by the Council. More time may be required if additional information or clarification is needed from the manufacturer.
- D When a product is classified as "Accepted" the classification is for 3 years. Renewal of the classification will be considered by the Council upon request by the manufacturer.
- E Companies with Accepted products are subject to the conditions stated in the Agreement Governing Use of ADA Seal of Acceptance.

### 2. Arrangement of a Submission

- A The submission is to be divided into sections and arranged in order as indicated in part II. Sections to be identified by tabs are designated by an asterisk (\*).

## II. INFORMATION TO BE SUBMITTED

All information submitted must conform to the Association's "Provisions for Acceptance of Products by the Council on Scientific Affairs."

### 1. **Cover Page**

- A Name of company
- B Product name

### \*2. **Table of Contents**

### \*3. **Company Information**

- A Name of company (to be used in official list of Accepted Products)
- B Address (to be used in listing)
- C Phone number (to be used in listing)
- D Fax number
- E Names of owners, officers and other individuals authorized to furnish information to the Council and represent the firm in dealing with the Council, including the main contact person. (Foreign manufacturers must have an office or branch located in the United States and the product must be available for purchase in the United States.)
- F Names and qualifications of scientific personnel responsible for formulation and testing of the product

### \*4. **Summary of Submission**

A comprehensive summary of the information submitted to support the safety and effectiveness of the product must be provided.

### \*5. **Product Information**

- A Name of product (to be used in listing)
- B Claims of efficacy
  - (i) All claims of efficacy, including "reduction of dentinal hypersensitivity" or "control of dentinal hypersensitivity" must be documented. Other examples of claims requiring documentation include "reduces sensitive teeth," "reduces sensitive roots," and "controls sensitive teeth"
  - (ii) All comparative claims must be supported by two independent clinical studies
  - (iii) All advertising material must comply with the American Dental Association's *Advertising Standards*
- C Patent title(s) and patent number(s) relating to the product

- D Product description
  - (i) Chemical composition (if applicable)
  - (ii) Material safety data sheet (MSDS) or a letter of explanation that an MSDS is not applicable
- E Instructions including indications and contraindications for use, precautions, adverse and allergic reactions
- F Labeling
- G Packaging
- H Promotional materials

**6. Quality Control Procedure for the Manufacturing of the Product**

**7. Safety Data**

Studies must be provided to demonstrate any effects on oral tissues from use of the product. Data determining the toxicologic, carcinogenic, and mutagenic effects of the product and its ingredients must be provided.

**\*8. Efficacy Data**

At least two double-blind clinical studies demonstrating a statistically significant effect on hypersensitivity by the active ingredient must be provided. All published studies showing the effectiveness of the active ingredient must be referenced, including studies that do not show any effect. All proprietary studies, including those that do not show any effect, must also be provided. A 20% statistically significant difference between control and experimental groups for one sensitivity index is required in both clinical trials. For any additional indices used (for example, temperature in addition to tactile) the only requirement is that there be a statistically significant effect favoring the treatment group. Subjects should be tested at two different time intervals to determine their response to pain stimuli and the responses must be within a reasonable range of one another ( $\pm 20\%$ ).

**\*9. Comprehensive Bibliography**

All publications referred to in the previous sections should be listed here.

**10. Copies of the Most Significant Articles**

The published articles which are of pivotal importance for the establishment of safety and effectiveness should appear here.

**11. Appendices**

Detailed descriptions of test evaluation methods and other defined areas should appear here. Copies of reports on the proceedings of conferences, symposia and individual articles detailing study design and statistical analysis should be among the material appended. Information relating to study design should include the following: Recommendations for evaluating agents for the reducing of dentinal hypersensitivity *JADA 112:709-710*, May, 1986; Endodontics and Dental Traumatology Vol. 2 No. 4 August, 1986; and Guidelines for the Design and Conduct of Clinical Trials on Dentinal Hypersensitivity *to be published*.

### III. STATEMENTS TO BE USED FOR PRODUCTS CLASSIFIED UNDER THESE GUIDELINES INCLUDING QUALIFIERS:

There will be three possible Seal statements to be used with an Accepted product, depending on the kind of product and whether it contains fluoride. If none of the statements below apply to the Accepted product, a statement will be developed by the Council.

#### **Statement 1: Non-fluoride desensitizing dentifrice**

With regular use, (Product Name) has been shown to relieve sensitivity to (specific clinically tested stimuli) in otherwise normal teeth, and can be of significant value when used as directed in a conscientiously applied program of oral hygiene and regular professional care. Council on Scientific Affairs—American Dental Association.

#### **\*Statement 2: Fluoride desensitizing dentifrice**

(Product Name) has been shown to be an effective decay-preventive dentifrice that can be of significant value when used as directed in a conscientiously applied program of oral hygiene and regular professional care. With regular use it also has been shown to relieve sensitivity in otherwise normal teeth. Council on Scientific Affairs—American Dental Association.

#### **\*Statement 3: 0.4% stannous fluoride gel making a hypersensitivity claim**

(Product Name) has been shown to be an effective decay-preventive home-use gel that can be of significant value when used as directed in a conscientiously applied program of oral hygiene and regular professional care. With regular use it also has been shown to relieve sensitivity in otherwise normal teeth. However, clinical effectiveness against plaque, gingivitis or other periodontal indication has not been proven. Council on Scientific Affairs—American Dental Association.

\*Note: Products must have also satisfied the Council requirements for fluoride-containing products

## IV. CLINICAL TEST PROTOCOL

### I. Intended Use of the Product in the Study

### II. Controls for Use as a Basis for Comparison

A negative control should be used in clinical studies determining the effectiveness of a test product. The ingredient thought to be active should be deleted for the formulation to act as the negative control. If the test product is not a formulation, but a single substance, then the product should be compared to another product known to be effective in the reduction or elimination of dentinal hypersensitivity or a negative control known to produce no reduction or elimination of dentinal hypersensitivity.

### III. Study Design and Statistical Analysis

**Kinds of Stimuli.** Materials, instruments and items selected for tests to produce the stimulus must be measurable, reproducible and behaviorally predictable. These devices can be used to produce mechanical (tactile), thermal, chemical and electrical stimuli. The reproducible quantification of a mechanical or tactile stimulus can be achieved using a probe from which the pressure applied to the surface being tested can be measured. The Yeaple Probe is an example of such a device.

A thermal stimulus should have the capacity to produce and measure changes in temperature.

There are at present no chemical substances which offer a reliable, valid, bias-free and versatile stimulus.

An electrical stimulus has been used by means of a dental pulp stethoscope. Controversy does exist over the validity of such a device, however. Some believe that, since an electrical stimulus is unlike any that exists clinically, it should not be used.

**Subject Population.** The clinical study must be double-blind, with random selection of subjects using either a parallel or crossover design. Subjects may be admitted over a period of time and must be fully informed of the study's nature. Their consent to submit to the testing must be obtained. A balance of age, sex and baseline pain measurement levels is highly recommended. Reliability of baseline pain measurements must be demonstrated. The sample size should be of sufficient power ( $\beta = .80$ ) at a 95% confidence level. Exclusion criteria should include the following:

- previous professional desensitizing treatment
- subject use of over-the-counter products within the previous six weeks
- medical histories made remarkable by chronic use of anti-inflammatory, analgesic and psychotropic drugs
- pregnancy and breast feeding
- allergies and idiosyncratic responses to product ingredients
- eating disorders
- systemic conditions that are etiologic or predisposing to dentinal hypersensitivity
- excessive dietary or environmental exposure to acids
- periodontal surgery or orthodontic treatment in the preceding three months
- teeth or periodontium with pathology or defects likely to cause pain
- teeth restored in the preceding three months
- abutment teeth for fixed or removable prostheses
- crowned teeth
- teeth that have extensive restorations and those with restorations extending into the test area

The teeth and sites to be tested should be on the facial surfaces of incisors, cuspids and bicuspid where the cervical regions, *i.e.*, the affected sites, are accessible.

From the time of subject selection until testing begins, a standardized oral hygienic regimen must be employed. No desensitizing products should be used during this period.

**Study Duration.** The duration of the study is dependent on the kind of agent being tested. If the product is hypothesized as being effective at reducing dentinal hypersensitivity, then six to eight weeks are necessary. If the product is designed to eliminate dentinal hypersensitivity for a specific period, it would be necessary to test immediately following its application with a follow-up test approximating the period thought to be the duration of effectiveness. If the product is designed to prevent dentinal hypersensitivity, periodic testing for one year is necessary.

The interval between various kinds of stimulus applications should be specified and be of sufficient duration to prevent interactions between stimuli.

**Application of the Stimulus.** Ideally, a stimulus should be measurable and, therefore, reproducible. When precise quantification is impossible, the loss in level of reproducibility must be weighed in relation to biologic significance.

Precise reproducibility of a stimulus requires that there always be a linear transfer of energy to the receptive field such as the pulp or tubule complex. When exact reproducibility is in question, multiple stimulus inductions may be necessary and considered fully in relation to the biologic significance of the study results.

All factors that may physically influence the transfer of energy from the stimulus to the receptor field (coupling with the tooth or the receptor field and variable resistance) and factors that psychophysiologicaly influence the receptor field locally such as "p" factors in the receptor system or central factors including anticipation, must be controlled to the extent possible during stimulus induction. Failure to control such factors will directly influence the potential level of reproducibility.

Overall, the stimulus should be applied with monotonically increasing or decreasing intensity. To prevent the subject from responding erroneously because of errors of habituation or anticipation, the most appropriate type of application for this stimulus is a randomized presentation with each level presented twice and with catch trials (in which no stimulus is delivered). Although this approach may not be easily adaptable to most clinical trials, it would be the most precise method for basic laboratory studies.

**Measurement of Responses.** Research has not identified a physiological index that is unequivocally related to changes in pain sensation and not simply related to stimulus intensity. It is impossible to measure pain by measuring only the physical attributes of the noxious stimulus (intensity, frequency, duration). Pain measurement intrinsically requires the assessment of a subjective parameter. The perception of pain is not always directly proportional to the extent of tissue damage or physical trauma that is produced by a defined stimulus.

The major categories of psychophysical methods for evaluation of pain can be classified as either traditional or contemporary. Traditional methods provide indirect assessment of pain by numerical estimates of detection, pain, or tolerance thresholds. Contemporary methods provide direct assessment of pain strength by expression of pain in units of the subjective intensity. Both methods, if properly used, are acceptable.

To measure pain accurately, investigators must assess the subjective experience of pain, as well as the characteristics of the stimulus producing pain. The necessary criteria for accurate, objective pain measure are as follow:

- **Reliability.** The procedure yields consistent results with time. Reliability across subjects and between test sessions should be determined.
- **Validity.** The procedure measures unequivocally a specific dimension of pain.
- **Bias-free.** The procedure is independent of method bias or patient or investigator response bias.
- **Versatility.** The procedure is applicable for both laboratory and clinical uses.

Where appropriate, more than one level of stimulus may be applied so as to assess the mathematical relationship of response to defined stimulus.

Psychological and physiological factors that may alter the degree of perception (for example—anticipation) should be controlled to the extent possible by standardization of procedure, training of the subject, demonstration of the stimulus and environmental controls (for example—noise, room temperature) including the “equilibrium” of the patient with the system.

To provide accurate interpretation and analysis of pain response, calibration studies should be conducted on pain assessment techniques so as to define the type of measurement scale that is appropriate. The method of calibration of the stimuli, however, remains open. Some attempt at calibration for each study design would be favorable.

Scales of pain that produce ratio scales permit accurate comparison of pain across different groups of patients and within the same patient.

The interval between various kinds of stimulus application should be specified and be of sufficient duration to prevent interactions between stimuli.

**Statistical Analysis.** The basis for determining sample sizes must be provided in the protocol and must meet the requirements given previously. Basic documentation should include summary statistics for baseline and outcome data for each treatment group.

Possible technical approaches to statistical analysis include, but are not limited to, analysis of variance or covariance, rank tests, or categorical methods depending primarily on the distribution of dependent variable scores that might be observed in a particular trial. Pooling of sensitivity data by patient as well as stratification of the data is allowed. While the nature of hypersensitivity treatments and the location of teeth and site studies does not lead to a strong expectation of site effects, site-specific analysis may be substituted for pooled analyses as appropriate. However, analysis of separate observations within mouths should appropriately account for lack of independence.

### III. Information reported

- A Methods and criteria for measurements
- B Description of test procedure
- C Data records
- D Description of each failure
- E Methods of analysis of data
- F Results of analysis of data
- G Conclusions based on data

**Note:** Manufacturers may submit protocols to the Council for review prior to commencing with studies. This review is intended to provide additional feedback to the investigators but cannot guarantee that performance of the study will result in Acceptance of the product.







