What is the validity and reliability of predictive animal studies to establish maximal safe dose?
What are the effects of concomitant medications (local anesthetics, antiemetics) upon safety and efficacy?
What pharmacokinetic and pharmacodynamic factors influence the safety and efficacious sedation of young children (1-4 years)?
How do dose-response measures vary in specific subpopulations such as the geriatric, medically compromised, and physically or mentally handicapped patient?

**Morbidity and Mortality**

Completely inadequate data currently exist such that the incidence of serious sequelae from the use of various popular anesthetic or sedative procedures in the dental setting cannot be predicted. Multicenter, geographically distributed morbidity and mortality studies need to be conducted addressing the following specific questions:

1. The incidence rate of major and minor side effects in relation to sedative/anesthetic techniques:
   - single drug sedation (oral, intramuscular (IM), rectal, buccal, inhalational, intravenous (IV))
   - multiple drug sedation (oral, IM, IV, rectal, buccal, inhalational).
   - general anesthesia (inhalational, IV)
2. The incidence of morbidity/mortality under different operating conditions:
   - single operator/anesthetist
   - surgical team concept
   - separate operator and anesthetist

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**Research Needs: Behavioral Management of Dental Anxiety**

**Definition of Problem**

A need exists to clarify the factors underlying the development of anxiety intense enough to interfere with dental treatment. Relevant sociocultural, as well as psychological variables should be addressed. These include the effects of parental attitudes and behaviors; other stress-related experiences; and coping responses related to dental anxiety. Particular attention should be directed toward identifying iatrogenic effects of inadequate dental management, including pain control.

**Needed Studies**

A prerequisite to meeting the goals of the behavioral management of dental anxiety is to describe and identify how dentist behaviors influence patient behaviors and experiences. Studies are needed to assess the behaviors of dentists as related to patient responses, both short-term and long-term. Examples of dentist behaviors should include whether management techniques or behaviors are varied according to the behaviors shown by a patient, and whether responses are appropriate to the different developmental levels of children. Dentists' communication skills should also be evaluated, as well as their relative use of punishment-oriented techniques.

Longitudinal and cross-sectional studies of the effects of different dental experiences would also yield important information. Examples of the variations in...
experience should include the developmental level of the patient at the first dental visit and the context of the visit, such as observation of a sibling versus an emergency dental visit. The number of preventive sessions prior to the use of a local anesthetic is also an important factor for consideration, as are prior related oral/dental or medical experiences. Prior experiences with parental separation, parental absence or presence during treatment, and parental behaviors (such as how parents respond to a child’s pain) must be considered.

Anxiety-relevant issues which are related to the developmental level of children should be conceptualized and measured. These issues include what children at different developmental levels fear in a dental situation; which coping skills are found to occur and how they are related to various situational and outcome variables; and how children at various developmental levels perceive their coping resources, conceptualize the dental experience, and process emotions experienced in the dental situation. This research agenda could be accelerated through descriptive cross-sectional and/or longitudinal research addressing developmental issues. Such research should demonstrate adequate conceptualization of constructs, use of standardized measures when they are available, and extensive use of observational measurement techniques.

Predictive relationships between children’s behaviors within the dental situation and subsequent behaviors such as health care utilization, personal health behaviors, and vulnerability to anxiety in other dental or medical settings need to be determined.

Improved measures of pain and anxiety responses must be developed, particularly for children. Quantifiable, age-relevant measures should be available to permit comparisons of results across studies. Parameters of anxiety (whether self-report, observed behaviors, or physiological measures) should be measured to establish normative and comparative data on persons in treatment as well as persons who avoid or report anxiety regarding dental treatment.

The development and assessment of the efficacy of interventions to prevent anxiety from interfering with dental treatment will greatly aid the field of behavioral management. This objective involves the integration of knowledge based on person variable-treatment variable aspects of the problem.

Interventions related to the treatment of dental anxiety or dental phobia are also needed. Development and assessment of the efficacy of both group and individual treatment interventions should be explored. Different levels of intervention outcome measures include eliminating avoidance of dental situations; enhancing compliance once there; longer term (trait) changes in dental anxiety and related behaviors; generalization to overall improvement in oral health care; and broader measures of overall self-esteem and general well being. There is a recognized need for more widely available specialized multidisciplinary phobia treatment centers for referral of the more severe dental phobias. Pooling of data such as patient characteristics and treatment outcomes across the centers would be particularly valuable.

The effects of personality variables and individual differences in receptivity to specific treatments for dental anxiety should be determined, as well as the potential usefulness of specific treatments. Some people may be more receptive to cognitive treatments, such as cognitive restructuring. Others may be more receptive to physiological treatments, such as biofeedback. As a corollary, some people experience emotion primarily in a cognitive mode, while others experience emotion primarily in a physiological mode. These and other personality differences may occur as a function of prior experience. Such individual differences need to be investigated for their relationships to the efficacy of specific behavioral interventions.

Critical Need

The need for multicenter or cross-laboratory research with common measures and protocols would greatly accelerate progress in meeting most of the research objectives mentioned above.

Interdisciplinary Issues: Anxiety Control in Child Dental Patients

Research Needs

In controlling anxiety in child dental patients, research is needed to assess the interaction between pharmacologic and behavioral management approaches. The pharmacologic and nonpharmacologic methods used to achieve patient cooperation should be examined both separately and in combination. Research should include studies of short-term effects, such as those observed between a series of appointments, and long-term effects, including those occurring after six months or longer. In addition, it is important to find out whether this behavior can be generalized to other situations, such as medical treatment.