

SKYLAB MEDICAL EXPERIMENTS ALTITUDE TEST

DETAILED TEST OBJECTIVE

I. EXPERIMENT/OPERATIONAL SYSTEM

A. Title: SMEAT Personal Oral Hygiene

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II. PURPOSE AND BACKGROUND

A. Purpose of Experiment

1. To monitor and compare microbial population dynamics in various oral microenvironments before, during and after extended isolations in land-based space simulators, and
2. To determine clinically the effects of a space simulated environment on oral health and pre-existing disease.

B. Justification for Experiment

Detectable changes in the oral microflora usually precede clinical changes and are a prerequisite to most acute and chronic oral pathoses (mucositis, dental caries and periodontal disease).

The oral cavity can serve as a portal of entry for pathogenic agents, may act as a reservoir for infectious microorganisms, and can play a prominent role in cross contamination and disease transmission.

The oral clinical examinations are essential for identifying changes in tissue integrity of both microbial and nonmicrobial origin.

III. PARTICIPANTS

A. Number of Crewmen Required

All three crewmen will participate.

B. Function of Each Crewman

Each crewman will serve as subject during the pre and post chamber test. In-chamber specimens will have to be collected by a designated crewman.

IV. FUNCTIONAL OBJECTIVES

F01 Detection by isolation and enumeration of culturable microbes from 4 intraoral specimens: residual saliva, stimulated saliva, crevicular fluid, and dental plaque. Up to 12 microbial categories will be studied from each specimen utilizing a variety of selective and differential culture media. Definitive characterization will only be performed on those microorganisms which display pronounced and/or persistent increases. Similar consideration will be given to recovery of microorganisms unique to oral microcosms.

V. TEST CONDITIONS

A. Environmental Requirements

None

B. Crew Constraints

1. Oral specimens need to be collected at the same hour and day each week either prior to or three hours following food and water ingestion or oral hygiene procedures.

V. TEST CONDITIONS (Cont'd)

B. Crew Restraints (Cont'd)

2. Approximately 10 minutes per crewman will be required for each semi-weekly sample collection starting 14 days prior to test. Three of the specimens will have to be collected by a principal investigator or by a designated crewman. One specimen, stimulated saliva, is collected by each crewman chewing and expectorating for approximately 5 minutes. Weekly in-chamber samples and semi-weekly post chamber samples will require the same crew constraints as the pre-chamber sample collections.
3. Clinical examination including x-rays, intra-oral photographs, plaque scores, inflammation and oral health indices will be performed on the crew within 14 days pre-test, prior to test initiation, and 14 days post test. These examinations will be carried out in the existing dental unit at M.S.C.
4. The crew will continue their daily normal dental hygiene procedures (tooth brush and paste, etc.) after samples are taken.

VI. HARDWARE REQUIREMENTS

All hardware required to perform the pre and post chamber clinical examinations will be provided by and performed in existing dental units at M.S.C. All pre and post chamber sampling hardware will be furnished by the principal investigators.

The following in-chamber sampling hardware is required:

<u>Identification</u>	<u>Purpose</u>
Bench or Table Space	To hold a specimen tray of approximately 1 square foot
Sampling Instruments	For the aseptic procurement of the sample
Collection Containers	For the proper transport and containment of the sample matter
Transport or Diluting Media	For proper preservation of sample matter

VI. HARDWARE REQUIREMENTS (Cont'd)

B. Identification and Purpose of GSE

Upon removal of specimens from the chamber, samples will be placed in cracked ice and brought to the University of Texas Dental Science Institute, Houston, Texas for processing. All pre and post chamber specimens will be treated in the same fashion as described for the in-chamber specimens.

VII. CHAMBER INTERFACES

A. Stowage Requirements

Space shall be allocated to maintain the 1 sq. foot tray holding sample instruments, collection containers and transport or diluting media.

B. Special or Unique Interfaces

Specimens will be removed through the transfer lock as quickly as possible for transport and processing.

VIII. CREW TRAINING

Briefing and training sessions shall be in accordance with the requirements as specified in the SMEAT Crew Training Program.

IV. SCHEDULING REQUIREMENTS

A. Pre-Chamber

	DAYS				
	T-14 (+2 days)	T-10 (+2 days)	T-7 (+2 days)	T-6 (+2 days)	T-2 (+1 day)
10 Min. Sample Collection*	X	X		X	X
45 Min. Clinical Exam.			X		

B. In-Chamber

B. In-Chamber								
DAYS								
	T+7 (+2 days)	T+14 (+2 days)	T+21 (+2 days)	T+28 (+2 days)	T+35 (+2 days)	T+42 (+2 days)	T+49 (+2 days)	T+55 (+1 day)
10 Min. x Sample Collection*	X	X	X	X	X	X	X	X

C. Post-Chamber

	DAYS				
	R+1 (+1 day)	R+6 (+2 days)	R+10 (+2 days)	R 14 (+2 days)	R+18 (+2 days)
10 Min. Sample Collection*		X	X	X	X
45 Min. Clinical Exam.	X				X

* Samples may be collected either between 6-7 AM or 9-10 AM but the hour of sampling needs to be consistent throughout.

X. DATA REQUIREMENTS

A. Experiment Measurements List

1. Detection and isolation of 12 microbial categories from four intraoral specimens (by analyses):
 - a. Residual saliva
 - b. Stimulated saliva
 - c. Crevicular fluid
 - d. Dental plaque
2. Clinical examination including:
 - a. X-rays
 - b. Intraoral photographs
 - c. Plaque scores
 - d. Inflammation and oral health indices

All data will be cumulated and processed at the University of Texas and made available as soon as possible upon completion of all procedures.

B. Unique Measurements to SMEAT

This entire experiment is unique to SMEAT.

C. Data from Other Experiments

None

D. Other Requirements

None

XI. FDF REQUIREMENTS

A timeline of test activity and dental procedures will be required.

XII. DEVIATIONS FROM APPROVED SKYLAB EXPERIMENT

This entire experiment is unique to SMEAT.