

**UNCLASSIFIED**

SECURITY CLASSIFICATION

RDB PROJECT CARD		TYPE OF REPORT		REPORTS CONTROL SYN. OL	
		Progress Report (C)		DD-RDR(A)48	
1. PROJECT TITLE		2. SECURITY		3. PROJECT NUMBER	
EFFECT OF ALTITUDE ON VINCENT'S STOMATITIS		Uncl		21-1201-0002 (21-23-008)	
		4. INDEX NUMBER		5. REPORT DATE	
		3243		3 May 1953	
6. BASIC FIELD OR SUBJECT		7. SUBFIELD OR SUBJECT SUBGROUP		7A. TECH. OBJ.	
Research		Medicine and Biology		PO-12 (102/13)	
8. COGNIZANT AGENCY		12. CONTRACTOR AND/OR LABORATORY		CONTRACT/W. O. NO.	
Air University		Georgetown University		AF 18(600)199	
9. DIRECTING AGENCY		Prin Inves:			
USAF School of Aviation		Dr. W. C. Hess			
Medicine		University of Minnesota		AF 18(600)318	
OFFICE SYMBOL		Prin Inves:			
TELEPHONE NO.		Dr. H. A. Zander			
10. REQUESTING AGENCY		13. RELATED PROJECTS		17. EST. COMPL. DATES	
Surgeon General, USAF		-		RES. Dec 54	
11. PARTICIPATION, COORDINATION, INTEREST		14. DATE APPROVED		DEV.	
Surgen General, US Army (I)		3 May 1948		TEST	
		15. PRIORITY		OP. EVAL	
		3		18. FY   FISCAL ESTS. (M \$)	
		16.		52 &	
				Prior   4M	
				53   27M	
				54   36M	
				55   45M	
19. This report replaces report on Project No. 21-23-008, dated 30 June 1952.					
20. REQUIREMENT AND/OR JUSTIFICATION					
<p>Acute exacerbations of Vincent's Stomatitis have been noted to occur more commonly in flying personnel than in nonflying personnel. This observation was developed and formulated by various dental surgeons of the Air Force during the past war period. It has been stated that the incidence of acute gingival infection averages 6.2 per cent for flying personnel as compared with 3.4 per cent for nonflying personnel. This project proposes to study the effect of altitude on Vincent's Stomatitis from various aspects.</p>					
21.					
a. <u>Brief</u>					
<p>This project will result in determining the validity of the clinical observations concerning the increase in Vincent's Stomatitis among flying personnel as compared to ground personnel</p>					
AIR UNIVERSITY, SAM, AEROMEDICAL					
22. RDB	SN	CN	IC & P	X	L
					C

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subjected to similar environmental conditions. Should the clinical data prove valid, further investigations into the causative factors will be made.

b. Approach

Upon completion of the statistical analysis of Air Force wide questionnaires in accordance with Air Force Letter 160-17, the rate and incidence of Vincent's Stomatitis will be accomplished relative to rated and nonrated personnel, as well as the geographical distribution of the disease. This knowledge however, is just the first phase of the problem. It soon became evident in evaluating the questionnaires that methods of diagnoses would have to be standardized in order to determine work load. Therefore the following approach to the problem was evolved.

(1) A coordinated clinical, histochemical, and histopathological laboratory study to be done at a large Air Force Base.

(2) Studies for methods of diagnoses that could be used by clinicians.

(3) Studies that could indicate etiological agents encountered within the Air Force, i.e., local stresses, systemic stresses, and a combination of both local and systemic stress.

(4) Studies to determine effective methods of treating this widespread disease.

Only by a systematic approach to this complex problem can we expect to be able to adequately treat and/or control the periodontal problem within the United States Air Force.

c. Subtasks

(1) The first phase of this project, the collection of data in accordance with Air Force Letter 160-17, was completed 4 April 1952. At that time, all data collected was given to the Department of Medical Statistics School of Aviation Medicine. Due to difficulties encountered with higher headquarters on security information, no results have been obtained from medical statistics.

(2) The School of Aviation Medicine is conducting a D.M.F. (decayed, missing, and filled) survey of Air Force inductees. This is being compared to a P.M.A. (papillary, marginal, and attached gingiva) survey to distinguish and compare the two largest problems accounting for the over-all effort of the USAF Dental Service.

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(3) The School of Aviation Medicine is conducting studies in methods of diagnosing Vincent's Stomatitis, necessitating the investigation of all stages encountered in the course of acute or chronic Vincent's Stomatitis. These studies include variations in fixation and staining of biopsy sections and their histopathological evaluation.

(4) The School of Aviation Medicine is investigating a technic which shows promise of aiding diagnostic methods by adapting Papanicolaou's technic of smears of exfoliative cells of the periodontium. These smears will, if the technic is successful, be equal to biopsies as a diagnostic aid.

(5) Two contractual subtasks have been initiated as reported in the previous progress report. These are:

(a) "The Effect of Stress on the Periodontal Structures" by Dr. Helmut A. Zander, principal investigator, University of Minnesota. Progress will be reported under 21e.

(b) "Research on the pH of the Periodontal Pocket and the Glycogen Content of the Adjacent Gingival Tissue," Dr. W. C. Hess, Principal Investigator, at Georgetown University, Washington, D. C. See progress under 21e.

d. Other Information

(1) General

Reference item 17, several subtasks which have been recently initiated, and which contribute to the project will extend beyond the estimated completion date. A more logical estimate would be December 1955.

(2) Funds

This project is being funded under line item No. 670-590 in the fiscal year 1953 program. The following is a breakdown of the funds listed in Block 18:

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	FY 52 & Prior	FY 53	FY 54	FY 55
Labor	\$-----	\$-----	\$-----	\$-----
Travel	-----	-----	-----	-----
Contract Services	-----	-----	-----	-----
Total R&D Funds	4,000	26,631	35,650	45,000
Materials	-----	-----	-----	-----
Total Funds	4,000	26,631	35,650	45,000

(3) Resource Requirements

(a) Manhours: Not reported

(b) Other Requirements: Not reported

e. Background History and Progress

(1) Background History

No analysis of data supplied medical statistics, USAF School of Aviation Medicine in April 1952 has been available. Upon receipt of this analysis, this phase of rate and incidence as well as distribution will be completed.

(2) Progress

(a) The School of Aviation Medicine has completed a preliminary survey of "Periodontal Disease among basic airmen at Lackland Air Force Base," Texas with the following results: A P.M.A. survey was made on 670 incoming airmen (average age 19.1 years) at Lackland Air Force Base. Approximately 85 per cent of the subjects were found to have some gingivitis. The survey was calculated on a percentage basis, taking into consideration the number of missing teeth. A 100 per cent dentition included 32 teeth, 30 papillary units, 32 marginal units, and 32 attached gingival units. In an average case of gingivitis, 35 per cent of the papillary gingivae, 14 per cent of the marginal gingivae, 1 per cent of the attached gingivae, and 16 per cent of combined papillary-marginal-attached gingivae were affected. This completed report is being prepared for publication.

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(b) A preliminary "Histological and Cytological Survey of Normal and Pathologic Human Gingival Tissue by the Use of Various Fixatives and Stains" has been completed. This study has been conducted by the School of Aviation Medicine. Gingival biopsies from apparently normal, mildly inflamed, hyperplastic, acute necrotizing ulcerative, chronic necrotizing ulcerative, and "clinically uninvolved" cases were analyzed. The fixatives used were 10 per cent formalin, 20 per cent formalin, Bouin's fluid (Allen's PFA-3 modification), Zenkers acetic and absolute alcohol. The stains used were routine hematoxylin and eosin, Van Gieson, Heidenhain's iron hematoxylin, periodic acid Schiff Macmanus and Brown-Brenn bacterial stain. Generally Zenker's acetic fixation was found best for studying epithelium and also staining tissues by the Brown-Brenn stain. Bouin's fixation was found best for studying nuclear detail of the epithelial cells and inflammatory elements. Absolute alcohol was the best fixative for studying the connective tissue as well as the glycogen content and the basement membrane. It is realized that this is a preliminary study of a very complex problem. However, it has been shown in this study that definite combinations of fixatives and stains should be considered when a particular cytological structure is being investigated in both normal and diseased states.

(c) An additional study under this project was undertaken by the School of Aviation Medicine entitled "A Study of Gingival Exfoliative Cytology and its Possible Use in the Diagnosis of Periodontal Disease." This study is primarily based on the possible effectiveness of the Papanicolaou stain in the diagnosis of periodontal disease among Air Force personnel. Thirty-five gingival smears and biopsies were obtained and found to fall into the following groups: Normal, papillary inflammation, papillary and marginal inflammation, papillary-marginal-attached inflammation, acute necrotizing, chronic necrotizing, and hyperplastic. These smears were fixed and stained according to the Papanicolaou technic. Biopsies were frozen in liquid nitrogen and subsequently dehydrated. Sections were made and stained according to the Papanicolaou technic. The smears were classified into seven different classes.

Smears were studied in combination with the biopsy section. A correlation was noted showing that smears alone could possibly be used as a diagnostic method, since they showed the degrees of inflammation. More work is necessary on this subject, as well as a more statistically sound number of smears and biopsies. However, this study discloses an interesting approach to the diagnosis of gingival disturbances. If further research on this approach proves successful, it will be invaluable as a diagnostic aid to the Services who deal with the treatment

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planning of large numbers of personnel.

(d) The University of Minnesota School of Dentistry has made the following progress on their project "The Effect of Stresses on the Periodontal Structures." The main thesis of the proposed research is the comparison of the effect of local stresses upon the periodontal tissues of normal animals and animals which have been subjected to the systemic stresses of simulated flight. Therefore it was necessary to devise a method by which known local stresses could be reproduced from animal to animal. This was accomplished by designing a force applicator. The experimental animal work on stress has been completed. The sectioning and staining of slides and their evaluation remains to be done. This subtask will be completed within the next fiscal year. Anticipated target dates for each phase as well as completion dates of the project appear to be progressing according to schedule.

(e) Research is being conducted on the pH of the Periodontal Pocket and the Glycogen Content of the Adjacent Gingival Tissue, Drs. W. C. Hess and A. G. Paulsen, Principal Investigators, Georgetown University, Washington, D. C. The number of patients studied is as yet too small to establish any definite trends or conclusions. Glycogen determinations have been reported on gingival tissues and a mean glycogen content of 0.123 per cent was found for pathological tissue. This is considerably lower than our preliminary results which have been tabulated.

The present experimental procedure will be continued at a rate determined by the availability of suitable patients. Arrangements are being made to obtain a number of samples of gingival tissue of normal character to establish a base line for comparison.

Extension of this project for one year will enable the investigator to standardize his methods of procedure and enlarge his clinical testing for a statistically reliable result. It is anticipated that target dates will be met on schedule.

f. Future Plans

Personnel changes and discharge of military investigators has retarded the work being conducted by the School of Aviation Medicine. However, the basic problem will be pursued as originally planned.

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Protocol of future experimental design

- (1) Standardization of clinical material, diagnostically, is partially complete.
- (2) Histological analysis is partially complete.
- (3) Histochemical analysis is partially complete.
- (4) Tissue culture analysis -- future.
- (5) Bacteriological analysis -- future.

g. Reference

Project reports on completed problems are in the process of publication.

h. Project Officer

Col T. E. Fischer  
Chief, Dental Sciences Group  
Phone 2193

HEADQUARTERS AIR RESEARCH & DEVELOPMENT COMMAND	
APPROVED PROJECT	
DATE OF APPROVAL 3 May 48	AUTHENTICATION <i>RW</i>

National Personnel Records Center  
Record Group 342  
Accession # 62-A-5057  
Box 2 of 4

File: 7756-14  
Title: "Temporomandibular Joint Physiology"