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U. S. ARMY PROSTHETICS RESEARCH LABORATORY

Walter Reed Army Medical Center  
Washington 12, D. C.

ANNUAL PROGRESS REPORT \*

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Reports Control Symbol MEDDH-288

1 July 1962 - 30 June 1963

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PROCESSED  
JUL 1963

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**A B S T R A C T**

**PROJECT NUMBER:** 3A012501A802

**PROJECT TITLE:** Surgery, Army Prosthetics Research

**TASK TITLE:** Porous Laminates

**REPORTING ACTIVITY:** U.S. Army Prosthetics Research Laboratory  
Walter Reed Army Medical Center  
Washington 12, D. C.

**REPORTING PERIOD:** 1 July 1962 - 30 June 1963

**INVESTIGATORS:** Hill

**REPORTS CONTROL SYMBOL:** MEDEN-288

**DESCRIPTION:** A method for preparing porous polyester laminates has been developed and the technique evaluated at New York University with good results.

**REFERENCES:**

- T.R. 6217 - Porous Polyester Laminates
- T.R. 6305 - Fabrication of a Porous Polyester Double-Wall EE Prosthesis Two-Step Method.
- MR 37-62 - Porosity Measurement of Latex Implants
- MR 47-62 - Homogeneously Tinted Porous Helmet Liner
- MR 50-62 - Porous Helmet Liner Materials: Ballistics Evaluation
- MR 58-62 - Porous Body Jacket

**A B S T R A C T**

**PROJECT NUMBER:** 3A012501A802

**PROJECT TITLE:** Surgery, Army Prosthetics Research

**TASK TITLE:** Burn Dressings

**REPORTING ACTIVITY:** U.S. Army Prosthetics Research Laboratory  
Walter Reed Army Medical Center  
Washington 12, D. C.

**REPORTING PERIOD:** 1 July 1962 - 30 June 1963

**INVESTIGATORS:** Nielson

**REPORTS CONTROL SYMBOL:** MEDDH-288

**DESCRIPTION:** A foamed high porosity acrylate terpolymer in sheet form (3' x 6') for the treatment of massive burns.

**REFERENCES:**

- T.R. 6224 - Fabrication of Burn Dressings from Foamed Acrylate Amide Elastomers
- T.R. 6307 - Burn Dressings from Foam Acrylic-Amide Elastomers  
Report No. 2

## A B S T R A C T

**PROJECT NUMBER:** 3A012501A802

**PROJECT TITLE:** Surgery, Army Prosthetics Research

**TASK TITLE:** Radiation Protection Drugs

**REPORTING ACTIVITY:** U.S. Army Prosthetics Research Laboratory  
Walter Reed Army Medical Center  
Washington 12, D. C.

**REPORTING PERIOD:** 1 July 1962 - 30 June 1963

**INVESTIGATORS:** Leonard - Hanks

**REPORTS CONTROL SYMBOL:** MEDDH-288

**DESCRIPTION:** Studies have continued on the synthesis of liquid polymers. During the year a detailed study was made of the mechanism of the base initiated polymerization of ethyl acrylate.

### REFERENCES:

- T.R. 6216 - The Synthesis of Liquid Polymers from Vinyl Thioloacetate
- MR-51-62 - Emulsification of PVTA3 (T.R.6216, Table #1)
- MR-14-63 - Synthesis of Alpha Cyano Heptyl Acrylate

**A B S T R A C T**

**PROJECT NUMBER:** 3A012501A802

**PROJECT TITLE:** Surgery - Army Prosthetics Research

**TASK TITLE:** Mechanical Hand

**REPORTING ACTIVITY:** U.S. Army Prosthetics Research Laboratory  
Walter Reed Army Medical Center  
Washington 12, D. C.

**REPORTING PERIOD:** 1 July 1962 - 30 June 1963

**INVESTIGATORS:** Riblett, Bushey, Brown

**REPORTS CONTROL SYMBOL:** MEDDH-288

**DESCRIPTION:** The development of five sizes of mechanical hands continued during this period and the accomplishments are as follows:

Hand Size II - Prototypes have been designed and fabricated  
Hand Size III - Brass castings have been prepared  
Hand Size V - Brass castings have been prepared  
Resilient Hand - This hand is 50% completed. In addition several highly efficient voluntary opening mechanisms have been designed and fabricated.

**REFERENCES:**

- T.R. 6221 - Hand Mechanism: Voluntary Opening w/Limited Range Feedback Control Stop
- M.R. 44-62- Initial Checkout of #2 Size Mechanical Hand  
49-62- Comparative Weights of the Nylon and All-Metal Model Size No. 1  
61-62- Replacement of Rigid Finger Core of Mechanical Hand, Child's Size with a Flexible Material

**A B S T R A C T**

**PROJECT NUMBER:** 3A012501A802

**PROJECT TITLE:** Surgery, Army Prosthetics Research

**TASK TITLE:** Prescription Military Identification Tag Covers

**REPORTING ACTIVITY:** U.S. Army Prosthetics Research Laboratory  
Walter Reed Army Medical Center  
Washington 12, D. C.

**REPORTING PERIOD:** 1 July 1962 - 30 June 1963

**INVESTIGATORS:** Lamb

**REPORTS CONTROL SYMBOL:** MEDDH-288

**DESCRIPTION:** The laboratory prepared 100 additional identification covers for further testing at the Natick, Massachusetts Laboratories.

**REFERENCES:**

MR-38-62 - Military Identification Tag Covers .

## A B S T R A C T

**PROJECT NUMBER:** 3A012501A802

**PROJECT TITLE:** Surgery, Army Prosthetics Research

**TASK TITLE:** Optical Inserts

**REPORTING ACTIVITY:** U.S. Army Prosthetics Research Laboratory  
Walter Reed Army Medical Center  
Washington 12, D.C.

**REPORTING PERIOD:** 1 July 1963 - 30 June 1963

**INVESTIGATORS:** Colman

**REPORTS CONTROL SYMBOL:** MEDDH-288

**DESCRIPTION:** Clinical studies conducted at Walter Reed General Hospital indicated that there were no major fitting problems with the M17 insert. Related components were designed for this item and forwarded through the Office of the Surgeon General to Europe for evaluation. This item is also being tested by the Canadian Army as a result of requests by the Quadpartite CBR Standardization Committee. Pre-prototype models of the M14 insert proved satisfactory and manufacturers models are now being evaluated. A new concept in design of inserts using polypropylene as a material is now in the engineering phase of development.

### REFERENCES:

- MR-33-62 - Optical Insert- Army Aircraan's CBS Mask (E75R4)  
(Report of Type 2 tests by US Army Aviation Board)
- MR-56-62 - Fitting Gage-Optical Insert Type I M17 Military Protective Mask

**A B S T R A C T**

**PROJECT NUMBER:** 3A012501A802

**PROJECT TITLE:** Surgery, Army Prosthetics Research

**TASK TITLE:** Internal Prostheses

**REPORTING ACTIVITY:** U.S. Army Prosthetics Research Laboratory  
Walter Reed Army Medical Center  
Washington 12, D. C.

**REPORTING PERIOD:** 1 July 1962 - 30 June 1963

**INVESTIGATORS:** Nielson

**REPORTS CONTROL SYMBOL:** MEDDH-288

**DESCRIPTION:** The laboratory has continued to develop internal body prostheses and to make them available to surgeons for evaluation. The following table summarizes the devices prepared and their disposition.

Disposition of Experimental Internal Body Prostheses

<u>Quantity</u>	<u>Material</u>	<u>Disposition</u>
5	Tracheostomy Collars	Walter Reed Gen. Hospital
4	Tracheal Composites	" " " "
4	Acrylate Tracheae	Brooks Army Med. Center
6	Esophagi	Univ. of Tennessee
40	Bile Ducts	" " "
12	Bile Ducts	Walter Reed Institute of
6	Acrylate End Segments and Dacron Center Segments for Special Implant Studies	Research
		Walter Reed Institute of Research

A B S T R A C T

PROJECT NUMBER: 3A012501A302  
PROJECT TITLE: Surgery, Army Prosthetics Research  
TASK TITLE: Evaluation of Below-Elbow Technique  
REPORTING ACTIVITY: U.S. Army Prosthetics Research Laboratory  
Walter Reed Army Medical Center  
Washington 12, D. C.  
REPORTING PERIOD: 1 July 1962 - 30 June 1963  
INVESTIGATORS: Plumb, Hodge, Farrow  
REPORTS CONTROL SYMBOL: MEDDH-288

DESCRIPTION: The final summary report on the fitting of the very short BE amputee is approximately 90% complete.

REFERENCES: None

A B S T R A C T

PROJECT NUMBER: 3A012501A802  
PROJECT TITLE: Surgery - Army Prosthetics Research  
TASK TITLE: Improved Materials for Prosthetic Devices  
REPORTING ACTIVITY: U.S. Army Prosthetics Research Laboratory  
Walter Reed Army Medical Center  
Washington 12, D. C.  
REPORTING PERIOD: 1 July 1962 - 30 June 1963  
INVESTIGATORS: Nielson, Eaton  
REPORTS CONTROL SYMBOL: MEDDH-288

DESCRIPTION: Research toward improved cosmetic glove materials having enhanced stain resistance and mechanical properties is being carried out. Several compositions were tested during this year and found to have superior properties to the present commercial glove.

REFERENCES:

- T.R. 6212 - Caucasian Shade Guide
- 6214 - Polyvinyl chloride copolymer resin Geon 135 in Plastisol
- 6223 - Effect of Increased Resin Content in Cosmetic Glove Plastisol NIKEP
- 6301 - Color Prescription Form for Cosmetic Gloves
- 6302 - Evaluation of Adiprene L-100 Urethane Rubber
- 6303 - Fabrication of an Improved Acrylate Cosmetic Glove Material

**A B S T R A C T**

**PROJECT NUMBER:** 3A012501A802

**PROJECT TITLE:** Surgery- Army Prosthetics Research

**TASK TITLE:** Cartilage Substitutes

**REPORTING ACTIVITY:** U.S. Army Prosthetics Research Laboratory  
Walter Reed Army Medical Center  
Washington 12, D. C.

**REPORTING PERIOD:** 1 July 1962 - 30 June 1963

**INVESTIGATORS:** Leonard, Nielson, Hodge

**REPORTS CONTROL SYMBOL:** MEDDH-288

**DESCRIPTION:** Efforts have been made to duplicate the mechanical and frictional properties of cartilage. Additional femoral head covers were prepared and surgically evaluated. The results of the evaluation indicated that further improvement in the material seems indicated.

**REFERENCES:** None

A B S T R A C T

PROJECT NUMBER: 3A012501A802

PROJECT TITLE: Surgery, Army Prosthetics Research

TASK TITLE: Blood Vessel Adhesives

REPORTING ACTIVITY: U.S. Army Prosthetics Research Laboratory  
Walter Reed Army Medical Center  
Washington 12, D. C.

REPORTING PERIOD: 1 July 1962 - 30 June 1963

INVESTIGATORS: Leonard, Brandes

REPORTS CONTROL SYMBOL: MEDDH-288

DESCRIPTION: The laboratory initiated a program directed toward the preparation of cyanoacrylic acid ester adhesives to be used for non-suture closings. During this period the methyl ethyl, butyl hexyl and callusolve esters were prepared.

REFERENCES: None

A B S T R A C T

PROJECT NUMBER: 3A012501A802  
PROJECT TITLE: Surgery, Army Prosthetics Research  
TASK TITLE: Facial Prostheses  
REPORTING ACTIVITY: U.S. Army Prosthetics Research Laboratory  
Walter Reed Army Medical Center  
Washington 12, D. C.  
REPORTING PERIOD: 1 July 1962 - 30 June 1963  
INVESTIGATORS: Urban, Ouellette, Lamb  
REPORTS CONTROL SYMBOL: MEDDH-288

DESCRIPTION: During this year a large number of facial prostheses of all types were fabricated from the acrylate terpolymer elastomer. A report detailing the procedure used and follow up results is approximately 90% complete.

REFERENCES: None .

A B S T R A C T

PROJECT NUMBER: 3A012501A802

PROJECT TITLE: Surgery, Army Prosthetics Research

TASK TITLE: Fabrics for Prosthetic Devices

REPORTING ACTIVITY: U.S. Army Prosthetics Research Laboratory  
Walter Reed Army Medical Center  
Washington 12, D. C.

REPORTING PERIOD: 1 July 1962 - 30 June 1963

INVESTIGATORS: Laboratory Staff Members

REPORTS CONTROL SYMBOL: MEDDH-288

DESCRIPTION: This laboratory has continued the project with the Philadelphia College of Textile Sciences. The college is continuing knitting research textiles for the laboratory's use in fabricating internal and external body prostheses.

REFERENCES:

MR-40-62 - Pore Size Determination (Tricot Fabric and Foam)

A B S T R A C T

PROJECT NUMBER: 3A012501A802

PROJECT TITLE: Surgery - Army Prosthetics Research

TASK TITLE: Porous Below-Knee Sockets with Soft Distal End

REPORTING ACTIVITY: U.S. Army Prosthetics Research Laboratory  
Walter Reed Army Medical Center  
Washington 12, D. C.

REPORTING PERIOD: 1 July 1962 - 30 June 1963

INVESTIGATORS: Leonard, Plumb

REPORTS CONTROL SYMBOL: MEDDH-288

DESCRIPTION: The laboratory developed a porous below-knee socket with a soft distal end. Several below-knee amputees were successfully fitted with the prosthesis and the method was taught to the New York University evaluating agency. It was found that the procedure required improvement to make the results more reproducible. This work is being carried out.

REFERENCES:

- M.R. 62-62 - Patellar-Tendon-Bearing Below-Knee Porous Socket w/Soft Distal End.
- T.R. 6305 - Fabrication of a Porous Polyester Double-Wall Below-Elbow Prosthesis, Two Step Method

**A B S T R A C T**

**PROJECT NUMBER:** 3A012501A802

**PROJECT TITLE:** Surgery, Army Prosthetics Research

**TASK TITLE:** Tracheostomy Collars

**REPORTING ACTIVITY:** U.S. Army Prosthetics Research Laboratory  
Walter Reed Army Medical Center  
Washington 12, D. C.

**REPORTING PERIOD:** 1 July 1962 - 30 June 1963

**INVESTIGATORS:** Nielson

**REPORTS CONTROL SYMBOL:** MEDDL-288

**DESCRIPTION:** Several tracheostomy collars of different designs were prepared and submitted to the Burn Therapy Section, Brooke Army Medical Center, Fort Sam Houston, Texas.

**REFERENCES:**

MR-17-63 - Tracheostomy Tube and Collar - A Complete System

A B S T R A C T

PROJECT NUMBER: 3A012501A802  
PROJECT TITLE: Surgery, Army Prosthetics Research  
TASK TITLE: Testing Prosthetic and other  
Mechanical Components  
REPORTING ACTIVITY: U.S. Army Prosthetics Research Laboratory  
Walter Reed Army Medical Center  
Washington 12, D. C.  
REPORTING PERIOD: 1 July 1962 - 30 June 1963  
INVESTIGATORS: Hodge  
REPORTS CONTROL SYMBOL: MEDDH-288

DESCRIPTION: The laboratory has been assigned the responsibility for carrying out accelerated testing of upper extremity components submitted by the Committee on Prosthetics Research and Development to develop criteria for future design and to develop conformance specifications. A variety of devices have been tested as indicated in the following reports.

REFERENCES:

- T.R. 6215 - Evaluation of Step-up Hinge with Lock
- T.R. 6213 - Evaluation of Dacron Cord
- MR-2-63 - Tensile Test of Velcro Tape
- MR-65-63 - Checkout of Two Step-up Hinges with Locks
- MR-54-62 - Step-up Hinge Checkout
- MR-53-62 - Cycling of Wrist Flexion Unit #157
- MR-44-62 - Elbow, Half Cycle, Large
- MR-49-62 - Initial Checkout of #2 Size Mechanical Hand
- MR-52-62 - Design for Golf Club Attachment for Amputees

**A B S T R A C T**

**PROJECT NUMBER:** 3A012501A802

**PROJECT TITLE:** Surgery, Army Prosthetics Research

**TASK TITLE:** Elbows

**REPORTING ACTIVITY:** U.S. Army Prosthetics Research Laboratory  
Walter Reed Army Medical Center  
Washington 12, D. C.

**REPORTING PERIOD:** 1 July 1962 - 30 June 1963

**INVESTIGATORS:** Riblett, Grahn

**REPORTS CONTROL SYMBOL:** MEDDH-288

**DESCRIPTION:** An electrically operated solenoid type elbow lock has been designed and fabricated. It is to be fitted to a patient and evaluated. An outside locking step-up type elbow lock has been designed and the drawings submitted to the Machine Shop.

**REFERENCES:**

- T.R. 6215 - Evaluation of Step-up Hinge with Lock
- T.R. 6218 - Design of a Step-up Hinge with Lock for Very Short BE Amputees
- T.R. 6306 - Elbow, 2½" Size with Half Cycle Alternator
- M.R. 41-62- Outside-Locking Step-up Elbow Hinge for Very Short Below-Elbow Amputees
- M.R. 45-62- Modification of Hosmer Outside-Locking Elbow Hinge to a Very Short BE Outside-Locking Step-up Hinge
- M.R. 46-62- Elbow, Half Cycle, Large
- M.R. 54-62- Step-up Hinge Checkout
- M.R. 65-62- Checkout of Two Step-up Hinges with Locks
- M.R. 8-63 - 2½" Elbow with Alternator Lock

**A B S T R A C T**

**PROJECT NUMBER:** 3A012501A802

**PROJECT TITLE:** Surgery, Army Prosthetics Research

**TASK TITLE:** Collar, Tracheostomy, Plastic

**REPORTING ACTIVITY:** U.S. Army Prosthetics Research Laboratory  
Walter Reed Army Medical Center  
Washington 12, D. C.

**REPORTING PERIOD:** 1 July 1962 - 30 June 1963

**INVESTIGATORS:** Urban

**REPORTS CONTROL SYMBOL:** MEDDM-288

**DESCRIPTION:** The Lexan tracheostomy collars prepared for the Inhalation Therapy Section, Walter Reed General Hospital, were found to be satisfactory and a final report was written.

**REFERENCES:** None

## A B S T R A C T

PROJECT NUMBER: 3A012501A802

PROJECT TITLE: Surgery, Army Prosthetics Research

TASK TITLE: Hook, Voluntary Closing w/Finger Flexion

REPORTING ACTIVITY: U.S. Army Prosthetics Research Laboratory  
Walter Reed Army Medical Center  
Washington 12, D. C.

REPORTING PERIOD: 1 July 1962 - 30 June 1963

INVESTIGATORS: Leonard, Colman

REPORTS CONTROL SYMBOL: MEDDH-288

DESCRIPTION: During this period the laboratory prepared several types of voluntary opening hooks with hook finger flexion as well as a voluntary closing hook with finger flexion. The prototypes are to be evaluated at APRL and amputee tested at New York University.

### REFERENCES:

MR-10-63 - Rubber Pads on APRL Hooks  
MR-20-63 - FLAC Hook Evaluation  
MR-12-63 - Holding Jigs-Re Child's Flexion Hook

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