

## Subject Index

### A

#### AMPUTATION

##### Bilateral leg traction method

Traction for the bilateral lower extremity amputee: A World War II improvisation. Holscher EC. 20(1):92-94, 1983.

##### Predicting successful level

Fluorometric prediction of successful amputation level in the ischemic limb. Silverman DG, et al. 22(1):23-28, 1985.

*Subjects:* Patients (N=39) who underwent lower limb amputation.

*Results:* Retrospective evaluation of amputations' success led to conclusion that the method of fluorometric prediction tested against alternate methods "... should prove a valuable adjunct in the assessment of the disvascular extremity."

##### VA research priorities

Research on what? Todd SP, Jr., et al. 21(1):2-3, 1984.

#### AMPUTEES

##### Below-knee temporary leg

Scotchcast® PVC interim prosthesis for below-knee amputees. Wu Y, et al. 18(2):40-45, 1981. (A Technical Note)

##### EPP upper-limb prosthesis control

An analysis of extended physiological proprioception as a prosthesis-control technique. Doubler JA, et al. 21(1):5-18, 1984.

##### Evaluation: needs and problems

Evaluation of problems and needs of veteran lower limb amputees in the San Francisco Bay area during the period 1977-1980. Hoaglund FT, et al. 20(1):57-71, 1983.

*Subjects:* (N=179) veterans, 74 percent service-

connected traumatic, 23 percent dysvascular, etc.

*Results:* "The most striking finding from the survey is the high incidence of residual limb discomfort." (Discussion pp. 68-69.)

Activity levels and functional status: Tables 5-10, pp. 60-62.

SACH foot: contribution to gait abnormalities is discussed.

##### Gait with new foot

Development and preliminary evaluation of the VA Seattle Foot. Burgess EM, et al. 22(3):75-84, 1985.

##### Single-muscle five-state control

Multistate myoelectric control: The feasibility of five-state control. Richard PD, et al. 20(1):84-86, 1983.

##### Skeletal attachment of artificial limbs

A future prosthetic limb device. Hall CW. 22(3):99-102, 1985.

##### Value of prompt prosthetic fitting

Immediate, early, and late postsurgical management of upper-limb amputation. Malone JM, et al. 21(1):33-41, 1984.

### B

#### BEDS

##### Mattress overlays for

##### Support systems for

Effectiveness of mattress overlays in reducing interface pressures during recumbency. Krouskop TA, et al. 22(3):1-7, 1985.

#### BIBLIOGRAPHIES

##### Behavioral vital signs

Functional assessment: An annotated bibliography. Allen

L, et al. 23(2):78-85, 1986. (Reprint from "Interconnector" 8(1), January 1985, UCIR, Michigan State University, East Lansing, MI)

### Joint Implants

Key references in biomaterials: bone/biomaterial interface in orthopedic joint implants, Gruen TA, et al. 23(2):59-77, 1986.

*References:* 428 entries from the literature ranging from histology through adhesives, interface biomechanics, clinical experience, techniques.

## BIOMATERIALS

### Bone-interfacing, in skeletal attachments

### Skin-interfacing, in skeletal attachments

A future prosthetic limb device. Hall CW. 22(3):99-102, 1985. (A Technical Note)

### Joint implant interfaces

Key references in biomaterials: bone/material interface in orthopedic joint implants. Gruen TA, et al. 23(2):59-77, 1986.

## BRAILLE

### Printed braille, via tactual aid

Text-scanning patterns of blind readers using optacon and braille. Hislop DW, et al. 22(3):54-65, 1985.

## C

## CASTS

### Walking

Walking casts: Effect on plantar foot pressures. Birke, et al. 22(3):18-22, 1985.

## COCHLEAR PROSTHESES

### Design considerations for

Compression systems for hearing aids and cochlear prostheses. White MW. 23(1):25-39, 1986.

## COCHLEAR IMPLANTS

### Speech communication

Speech communication for the deaf: Visual, tactile, and cochlear implant. Pickett JM. 23(1):95-99, 1986. (A review of current electronic-device R&D)

## COMPUTERS

### Hearing aid simulation

Compression systems for hearing aids and cochlear prostheses. White MW. 23(1):25-39, 1986.

A digital master hearing aid. Levitt H, et al. 23(1):79-87, 1986.

(For more detail see entry under **HEARING IMPAIRMENT:** Evaluating aids by digital simulation)

### Information service system

Automated retrieval of information on assistive devices (ARIAD). Szeto AYJ, et al. 18(2):27-34, 1981. (A Technical Note)

*ARIAD* is a set of computer programs developed at the Biomedical Engineering Dept., Louisiana Tech University, Ruston, LA 71272.

*Features:* minimized staffing requirements and computer-aided matching of end-user needs and a particular device, etc.

### Microprocessor-controlled robot arm

Early clinical evaluation of a robot arm/worktable system for spinal cord injured persons. Seamone W, et al. 22(1):38-57, 1985.

### Middle-ear measurements

Digital instrument for measurement of aural acoustic immittance: A preliminary report. Robinette LN, et al. 23(2):34-47, 1986. (A Technical Note)

### Myoelectric prosthesis, control with

Digital approaches to myoelectric state control of prostheses. Philipson L, et al. 18(2):3-11, 1981.

### Rehabilitative assets

The practical use of microcomputers in rehabilitation. Vanderheiden GC. 19(1):1-5, 1982.

**Simulation of devices in software**

Digital approaches to myoelectric state control of prostheses. Philipson L, et al. 18(2):3-11, 1981.

**Speech processing for cochlear implant**

Nucleus 22-channel cochlear implant: Preliminary observations. Hirshorn MS, et al. 23(2):27-33, 1986. (A Technical Note)

**Speech-segment, recognition by**

Some rehabilitative considerations for future speech-processing hearing aids. Revoile SG, et al. 23(1):89-94, 1986.

**'VisiCalc'® supplies words for paralyzed user**

A new communications technique for the nonvocal person, using the Apple II computer. Seamone W. 19(1):28-33, 1982. (A Technical Note)

**Word communication for multiply handicapped**

Microprocessor-based communications system for the nonverbal person with serious motor handicaps. Pollak IV. 19(1):7-17, 1982.

**CUSHIONS****Pressure measurements**

Evaluation of transducer performance for buttock/cushion interface pressure measurements. Reddy NP, et al. 21(1):43-50, 1984.

(See also: PRESSURE ON FLESH entries)

**D****DIABETES****Plantar ulcers in**

Walking casts: Effect on plantar foot pressures. Birke JA, et al. 22(3):18-22, 1985.

**DIGITAL DEVICES****Inner-ear measurements**

Digital instrument for measurement of aural acoustic immittance: A preliminary report. Robinette LN, et al. 23(2):34-47, 1986. (A Technical Note).

**DIGITAL PROCESSING****... in hearing aid design**

See: **HEARING IMPAIRMENT**: Evaluating aids by digital simulation.

**DRIVING****Quadriplegic prospective-driver evaluation**

A simulator for objectively evaluating prospective drivers of the Scott Van. Hogan HA, et al. 19(1):19-27, 1982.

**DRIVER TRAINING****Evaluator/trainer, indoor**

Aid for training and evaluation of handicapped drivers. Reger SI, et al. 18(2): 35-39, 1981. (A Technical Note)

*Subjects:* (N=9) persons with traumatic tetraplegia of 5 to 41 months duration; levels of injury were from C-5-6 to C-8.

*Device:* Described as "... a realistic driver-evaluator and training aid for persons requiring medical authorization for driving."

**E****ELECTRIC WHEELCHAIRS****VA Standards for**

Veterans Administration Standards for Electrically Powered Wheelchairs. Reprinted from Federal Register of December 15, 1981 (Vol. 46, No. 240). 19(1):130-138, 1982.

**ELECTRODES: See FES**

**EMG****Muscular synergy patterns in**

Electromyographic patterns in adult locomotion: A comprehensive review. Shiavi R. 22(3):85-98, 1985.

**ENGINEERING****Clinical Team Role**

Comments for a new generation of rehabilitation engineers. Foort J. 22(1):2-8, 1985. (A Guest Editorial)

**EVALUATION****Algorithms evaluated via software**

Digital approaches to myoelectric state control of prostheses. Philipson L, et al. 18(2):3-11, 1981.

**Amputation level prediction**

Fluorometric prediction of successful amputation level in the ischemic limb. Silverman DG, et al. 22(1):23-28, 1985.

**Battery types compared (wheelchair)**

Wheelchair batteries: Driving cycles and testing. Kauzlarich JJ, et al. 20(1):31-43, 1983.

**Casters tested for shimmy (wheelchair)**

Wheelchair caster shimmy and turning resistance. Kauzlarich JJ, et al. 21(2):15-29, 1984.

**Cochlear implant, preliminary clinical**

Nucleus 22-channel cochlear implant: Preliminary observations. Hirshorn MS, et al. 23(2):27-33, 1986. (A Technical Note)

**Cochlear prosthesis**

Evaluation of a cochlear prosthesis using Connected Discourse Tracking. Levitt H, et al. 23(1):147-154, 1986.

*A method for representing prosthesis-based improvements which takes learning effects into account is developed and discussed.*

**Compression hearing aids**

Multichannel syllabic compression for severely impaired listeners. De Gennaro S, et al. 23(1):17-24, 1986.

**Computer simulation in hearing aid design**

A digital master hearing aid. Levitt H, et al. 23(1):79-87, 1986.

**Device field-test in a clinical setting**

A myofeedback instrument for clinical use. McCarthy CF, et al. 21(2):39-44, 1984.

A new low-cost, lightweight, compact audio-electromyographic threshold device is field-tested in six busy medical centers.

Six first-generation devices were field-tested by physical therapists; recommendations of therapists were incorporated in a second-generation unit and six of them were field-tested.

**EPP control for prosthesis**

Design and evaluation of a prosthesis control system based on the concept of extended physiological proprioception. Doubler JA, et al. 21(1):19-31, 1984.

**FM auditory trainers**

Speech perception through FM auditory trainers in noise and reverberation. Picard M, et al. 23(1):53-62, 1986.

**Hearing aid simulation**

Compression systems for hearing aids and cochlear prostheses. White MW. 23(1):25-39, 1986.

**Hearing-aid telecoil and phone receiver types**

Inductive coupling of hearing aids and telephone receivers. Stoker RG, et al. 23(1):71-78, 1986.

**Lower limb amputee problems**

Evaluation of problems and needs of veteran lower limb amputees in the San Francisco Bay Area during the period 1977-1980. Hoaglund FT, et al. 20(1):57-71, 1983.

**Mattress overlays**

Effectiveness of mattress overlays in reducing interface pressures during incumbency. Krouskop TA, et al. 22(3):7-10, 1985.

**Middle-ear measurement**

Digital instrument for measurement of aural acoustic immittance: A preliminary report. Robinette LN, et al. 23(2):34-47, 1986. (A Technical Note)

**Orthotic shoe insoles**

Compressive behavior after simulated service conditions

of some foamed materials intended as orthotic shoe insoles. Campbell GJ, et al. 21(2):57-65, 1984. (A Technical Note)

*Mechanical characteristics* of a large group of soft-tissue supplements.

### **Predicting driving ability**

Aid for training and evaluation of handicapped drivers. Reger SL, et al. 18(2):35-39, 1981. (A Technical Note)

### **Pressure-on-flesh measurements**

Evaluation of transducer performance for buttock-cushion interface pressure measurements. Reddy NP, et al. 21(1):43-50, 1984.

Two types of semiconductor transducers and two types of pneumatic transducers were bench-tested. *In vivo* tests used wick catheters in human thigh as control to evaluate an air-cell type transducer.

### **Prospective drivers, paraplegic**

A simulator for objectively evaluating prospective drivers of the Scott Van. Hogan HA, et al. 19(1):19-27, 1982.

### **Prosthetic foot (VA Seattle Foot)**

Development and preliminary evaluation of the VA Seattle Foot. Burgess EM, et al. 22(3):75-84, 1985.

### **Robotic arm/worktable system**

Early clinical evaluation of a robot arm/worktable system for spinal cord injured persons. Seamone W, et al. 22(1):38-57, 1985.

*Part I:* Developmental case study 1974-1982 (pp. 38-46).

*Part II:* Clinical evaluation program: Richmond VAMC (N=9); Cleveland VAMC (N=7); and Baltimore-Washington area (N=4) (pp. 47-57).

*Patient-by-patient* summary of patient characteristics and evaluation results are supplied.

### **Speech acquisition aid**

Vibrotactile stimulation: Case study with a profoundly deaf child. Geers AE. 23(1): 111-117, 1986.

### **Tactile sentence identification aid**

Continuing evaluation of the Queen's University tactile vocoder. 2: Identification of open set sentences and tracking narrative. Brooks, et al. 23(1):129-138, 1986.

### **Tactile work identification aid**

Continuing evaluation of the Queen's University tactile vocoder. 1: Identification of open set words. Brooks PL, et al. 23(1):119-128, 1986.

### **Value of prompt prosthetic fitting**

Immediate, early, and late postsurgical management of upper limb amputation. Malone JM, et al. 21(1):33-41, 1984.

### **VA Rehab R&D, new unit**

The new evaluation unit of the Veterans Administration's Rehabilitation Research and Development Service. Reswick JB. 22(1):31-36, 1985. (A Special Article)

*Purpose:* To assist at every stage in the process from research-in-progress to manufacturers getting into production commercially.

A list identifies 10 prototype devices or systems already in some stage of evaluation by this new unit at time of writing.

Information for researchers and developers whose project is approaching prototype stage is included.

### **Wheelchair accessory**

Evaluation of a curb-climbing aid for manual wheelchairs: Considerations of stability, effort, and safety. Szeto AYJ, et al. 20(1):45-56, 1983.

## **F**

### **FEET**

#### **Orthotic insole materials**

Compressive behavior after simulated service conditions of some foamed materials intended as orthotic shoe insoles. Campbell GJ, et al. 21(2):57-65, 1984. (A Technical Note)

#### **Plantar foot pressures**

Walking casts: Effect on plantar foot pressures. Birke JA, et al. 22(3):18-22, 1985.

*Subjects:* (N=6) Normals.

*Sites:* Four sites on the right foot while walking in standard shoe, in conventional padded cast, in total-contact cast, and again in a shoe.

Plantar foot pressures during walking: "significant differences were found between the mean relative pressure walking in shoes compared with casts."

## FERROGRAPHY

### Monitoring wear in prosthetic or natural knee joints

The wear-particles of synovial fluid: Their ferrographic analysis and pathophysiological significance. Evans CH, et al. 18(2):13-26, 1981. (A Technical Note)

## FES (FUNCTIONAL ELECTRICAL STIMULATION)

### Biped gait in paraplegia

Gait restoration in paraplegic patients: A feasibility demonstration using multichannel surface electrode/FES. Kralj A, et al. 20(1):3-20, 1983.

### Gait, restoration of

Gait restoration in paraplegic patients: A feasibility demonstration using multichannel surface electrode/FES. Kralj A, et al. 20(1):3-20, 1983.

See also detailed entry for this paper under **SPINAL CORD INJURY**.

### Leg propulsion of wheelchair

Locomotion via paralyzed leg muscles: Feasibility study for a leg-propelled vehicle. Glaser RM, et al. 20(1):87-92, 1983. (A Technical Note)

### Strengthening paralyzed muscles

A system for evaluation and exercise-conditioning of paralyzed leg muscles. Gruner JA, et al. 20(1):21-30, 1983.

### Sequences for gait

See **GAIT**, synthesis of

## FOREIGN RESEARCH

### Yugoslavia, research from

Gait restoration in paraplegic patients: A feasibility demonstration using multichannel surface-electrode/FES. Kralj A, et al. 20(1):3-20, 1983.

## G

## GAIT

### Blind traveler's gait recorded

Measuring gait-related blind mobility performance. Hollyfield RL, et al. 22(3):66-74, 1985.

### Restoration of, in paraplegia

Gait restoration in paraplegic patients; A feasibility demonstration using multichannel surface electrode/FES. Kralj A, et al. 20(1):3-20, 1983.

### Ultrasonic data generation

Qualitative and quantitative gait phase analysis by continuous monitoring of inter-ankle distance. Pinzur MS, et al. 21(2):50-53, 1984. (A Technical Note)

See also **LOCOMOTION**

## GERIATRICS

### Pressure on flesh

The effectiveness of preventive management in reducing the occurrence of pressure sores. Krouskop TA. 20(1):74-83, 1983.

### Pressure sores

Effectiveness of mattress overlays in reducing interface pressures during recumbency. Krouskop, et al. 22(3):7-10, 1985.

### Seating: Pressure on flesh

Skin blood flow changes and tissue deformations produced by cylindrical indentors. Sacks, et al. 22(3): 1-6, 1985.

More detailed entry under **SPINAL CORD INJURY**

## H

**HANSEN'S DISEASE****Plantar ulcers in**

Walking casts: Effect on plantar foot pressures. Birke JA, et al. 22(3):18-22, 1985.

**HEARING IMPAIRMENT****Aids, speech-processing**

Some rehabilitative considerations for future speech-processing hearing aids. Revoile SG, et al. 23(1):89-94, 1986.

*Subjects:* (N=15) for study of syllables with vowel-duration enhancement; (N=14) for study of syllables with enhanced spectral clues. Both groups of subjects were undergraduate students with moderate to profound hearing loss.

*Studies* of the effects of enhancement of real-time spectral and temporal acoustic cues to recognition of speech.

*Comments:* Possible need for training for users of future hearing aids that digitally enhance speech segments.

**Aids, use with telephone**

Induction loop listening system designed for a classroom. Letowski TR, et al. 23(1):63-69, 1986.

*Subjects:* (N=36) Twelve each in moderate (pre-cipitous), moderate (gradual) and severe hearing loss categories.

*Evaluations:* Telephone receiver types (N=4), and hearing aids (N=9) represent a range of telecoil locations, types, and orientations.

**Classroom listening system**

Induction loop listening system designed for a classroom. Letowski TR, et al. 23(1):63-69, 1986.

*Subjects:* (N=10) hearing impaired with mild-to-moderate hearing loss not using aids, and hearing aid users (N=10) with moderate hearing loss.

*Design principles* are discussed in context of an actual loop installation in a medium-size classroom. Basic advantages and limitations of this type of

system are listed and discussed.

*Results:* Mean average discrimination scores with and without babble are provided and compared with PA system result for both subject groups together.

(ATBCB) The Architectural and Transportation Barriers Compliance Board rulings requiring this or alternate types of systems are noted.

**Cochlear implant evaluation**

Nucleus 22-channel cochlear implant: Preliminary observations. Hirshorn MS, et al. 23(2):27-33, 1986. (A Technical Note)

*Subjects:* Profoundly-totally postlingually deaf adults (N=37).

Purpose of paper: "...to provide a description of a technologically advanced 22-electrode speech-feature-extraction type cochlear prosthesis, and to present some preliminary results of the clinical study to date." (Begun in 1982)

**Cochlear prosthesis evaluation**

Evaluation of a cochlear prosthesis using Connected Discourse Tracking. Levitt H, et al. 23(1):147-154, 1986.

*Subjects:* (N=5) fitted with the Nucleus multichannel prosthesis with 22-electrode array implanted in cochlea.

*Presentation of results:* A method for representing prosthesis-based improvements, which takes learning effects into account, is developed and discussed.

*Connected Discourse Tracking*, a technique for evaluating overall communication ability, is analyzed and its characteristics are examined.

**Compression aids compared**

Multichannel syllabic compression for severely impaired listeners. De Gennaro S, et al. 23(1):17-24, 1986.

*Subjects:* (N=2) 29-year-old women with severe bilateral sensorineural hearing loss of congenital origin.

*Devices:* Three compression systems were used, which placed 25, 50, or 90 percent of the short-term amplitude distributions in each of 16 frequency bands within the listener's residual auditory area.

A comparison linear-amplification system was also employed.

**Compression system design**

Compression systems for hearing aids and cochlear prostheses. White MW. 23(1):25-39, 1986.

**Digital technology: effect on R&D**

A guide to this issue. Levitt H. 23(1):ix-xii, 1986.

**Evaluating aids by digital simulation**

A digital master hearing aid. Levitt H, et al. 23(1):79-87, 1986.

*Computer simulation No. 1:* A conventional master hearing aid, simulated, demonstrates application of computer control in prescriptive fitting of conventional aids.

*Computer simulation No. 2:* Demonstrating a hypothetical aid that would automatically reduce background noise by means of digital signal processing techniques.

**Family of aids for a population**

Performance requirements for hearing aids. Dillon H, et al. 23(1):1-15, 1986. (A Special Article)

**FM auditory trainers**

Speech perception through FM auditory trainers in noise and reverberation. Picard M, et al. 23(1):53-62, 1986.

**Hearing aids, design, simulation**

Compression systems for hearing aids and cochlear prostheses. White MW. 23(1):25-39, 1986.

*Background:* Theory of compression systems, single- and multiple-channel systems, comparisons.

*Simulation in software* used to compare system types and design approaches.

*Results:* Design considerations for optimum multi-channel systems are identified.

**Interdisciplinary introduction to the field**

Hearing impairment and sensory aids: A tutorial review. Levitt H. 23(1):xiii-xviii, 1986.

**Listening systems compared**

Comparison of amplification systems in a classroom. Nabelek AK, et al. 23(1):41-52, 1986.

*Subjects:* Four groups were tested: Young normal-hearing adults (N=10); Hearing impaired not using aids (N=10); Hearing aid users (N=10); and Elderly (N=9).

*Systems compared:* Audio induction loop, FM radio, and infrared-light-transmitted sound were coming with a PA system.

**Matching aids to a population**

Performance requirements for hearing aids. Dillon H, et al. 23(1):1-15, 1986. (A Special Article)

*Purpose:* The work reported had as its aim the determination of specifications for hearing aids to be issued by the National Acoustic Laboratories (NAL) of Australia.

*Population served:* Veterans, pensioners, children.

*Requirements:* Hearing aid frequency responses, SSPL characteristics, compression limiting, directional response, and internal noise are examined.

**Middle-ear measurements**

Digital instrument for measurement of aural acoustic immittance: A preliminary report. Robinette, LN, et al. 23(2):34-47, 1986.

*Development of techniques* for measurement of aural acoustic immittance is reviewed. Measurement characteristics of selected AAI instruments are compared.

*Digital and analog* AAI instruments are operationally assessed.

**Speech communication aids**

Speech communication for the deaf: Visual, tactile, and cochlear-implant. Pickett JM. 23(1):95-99, 1986. (A review of current electronic device R&D)

**Speech & language development aid**

Vibrotactile stimulation: Case study with a profoundly deaf child. Geers AE. 23(1):111-117, 1986.

*Subjects:* (N=2) profoundly deaf girls, one described in the literature and one tested by the author during the period of speech and language development.

*Device:* Single-channel body-worn vibrotactile device: Bone vibrator held on sternum. Subject received the aid at age 29 months.

**Speech perception in noise**

Speech perception through FM auditory trainers in noise and reverberation. Picard M, et al. 23(1):53-62, 1986.

*Subjects:* Experiment One; young adults (N=8) with no history of ear pathology. Experiment Two;

young adults (N=40) with no history of ear pathology.

*Experiment One:* Speech intelligibility using auditory trainers in FM and conventional modes in degraded listening environments.

*Experiment Two:* Comparison of four different auditory trainers, in both modes, all in degraded listening environments.

*Practical non-classroom use* of FM auditory trainers is discussed: Suggestion is made for addition of FM receiver to conventional hearing aids.

### Speech production training

The use of visual and tactile sensory aids in speech production training: A preliminary report. McGarr NS, et al. 23(1):101-109, 1986.

*Reports:* Preliminary data from the first year of a long-term study.

*Subjects:* Hearing-impaired children (N=20) all aided binaurally and all with speech "too high-pitched" or "flat and monotonous."

*Results:* Effects of tested training modes on subjects' control of average speech pitch and intonation contour are reported.

### Tactile aid evaluation

Continuing evaluation of the Queen's University tactile vocoder. 1: Identification of open set words. Brooks PL, et al. 23(1):119-128, 1986.

*Subject:* (N=1) normal-hearing female graduate student experienced on the tactile vocoder but without lipreading training.

*Device:* Fourth-generation tactile vocoder design that processes acoustic waveform into 16 filter channels, each of which activates a vibrator on the skin surface. A wearable version of the device is an ultimate research goal.

*Research design:* 3,000-word list not shown to subject. Subject's ability to identify words was tested using tactile vocoder alone, lipreading alone, and lipreading enhanced by the tactile vocoder.

### Tactile aid evaluation

Continuing evaluation of the Queen's University tactile vocoder. 2: Identification of open set sentences and tracking narrative. Brooks PL, et al. 23(1):129-138, 1986.

*Subject:* (N=1) The same normal-hearing female graduate student subject of Evaluation 1 (words).

*Device:* See comment on preceding paper.

*Research design:* 2,000 open set English sentences presented under lipreading alone and lipreading + tactile-vocoder conditions.

*Tracking:* Reception of ongoing speech evaluated by time needed to repeat phrases verbatim in lipreading alone and lipreading + vocoder modes.

### Tactile aids for

Speech communication aids for the deaf: Visual, tactile, and cochlear-implant. Pickett JM. 23(1):95-99, 1986. (A review of current electronic device R&D)

### Tactile lipreading aid tested

Tracking skill of a deaf person with long-term tactile aid experience: A case study. Cholewiak RW, et al. 23(2):20-26, 1986.

*Comparison* of performance across three languages with and without a tactile aid in a trilingual profoundly deaf subject.

*Tactile aid:* Kanievsky wearable vibrotactile device with separate wrist vibrators transducing outputs from broadband and from higher-frequency sound.

### Tactile supplements to lipreading

Lipreading with tactile supplements. Boothroyd A, et al. 23(1):139-146, 1986

*Subjects:* (N=2) normal-hearing female graduate students without formal training in lipreading.

*Devices compared:* A single-channel and an eight-channel vibrating-solenoid skin display of fundamental voice frequency.

### Telephone coupling to hearing aids

Inductive coupling of hearing aids and telephone receivers. Stoker RG, et al. 23(1):71-78, 1986.

### Training for hearing aid users

Some rehabilitative considerations for future speech-processing hearing aids. Revoile SG, et al. 23(1):89-94, 1986.

(for) veterans (Australian)

Performance requirements for hearing aids. Dillon H, et al. 23(1):1-15, 1986. (A Special Article)

### Visual aids for

Speech communication for the deaf: Visual, tactile, and

cochlear implant. Pickett JM. 23(1):95-99, 1986. (A review of current electronic device R&D)

## I

### IMPLANTS

#### **Bone/biomaterial interface (bibliography)**

Key references in biomaterials: Bone/biomaterial interface in orthopedic joint implants. Gruen TA, et al. 23(2):59-77, 1986. (A Bibliography)

### INFORMATION

#### **Rehabilitation, service system for**

Automated retrieval of information on assistive devices (ARIAD) Szeto AYJ, et al. 18(2):27-34, 1981. (A Technical Note)

### ISCHEMIA

#### **Lower limb amputation**

Fluorometric prediction of successful amputation level in the ischemic limb. Silverman DG, et al. 22(1):23-28, 1985.

## J

### JOINTS

#### **Bone/biomaterial interface (bibliography)**

Key references in biomaterials: Bone/biomaterial interface in orthopedic joint implants. Gruen TA, et al. 23(2):59-77, 1986.

#### **Wear-monitoring prosthetic and natural diarthrodial joints**

The wear-particles of synovial fluid: Their ferrographic analysis and pathophysiological significance. Evans CH, et al. 18(2):13-26, 1981. (A Technical Note)

*Subjects:* (N=50) samples of synovial fluid aspirates (human knee). Animal model preliminary results noted.

*Diagnostic and predictive technique potentials.*

## K

### THE KNEE

#### **Monitoring change in natural or prosthetic knee joints**

The wear-particles of synovial fluid: Their ferrographic analysis and pathophysiological significance. Evans CH, et al. 18(2):13-26, 1981. (A Technical Note)

## L

### LIPREADING

#### **Performance with a tactile aid**

Tracking skill of a deaf person with long-term tactile aid experience: A case study. Cholewiak RW, et al. 23(2):20-26, 1986.

#### **Speech and language acquisition aid with**

Vibrotactile stimulation: Case study with a profoundly deaf child. Geers AE. 23(1):111-117, 1986.

#### **Tactile supplements compared**

Lipreading with tactile supplements. Boothroyd A, et al. 23(1):139-146, 1986.

#### **Tactile supplement evaluated (A)**

Continuing evaluation of the Queen's University tactile vocoder. 1: Identification of open set words. Brooks PL, et al. 23(1):119-128, 1986.

#### **Tactile supplement evaluated (B)**

Continuing evaluation of the Queen's University tactile vocoder. 2: Identification of open set sentences and tracking narrative. Brooks PL, et al. 23(1):129-138, 1986.

### LISTENING SYSTEMS

#### **Audio loop, FM radio, and Infrared compared**

Comparison of amplification systems in a classroom. Nabelek AK, et al. 23(1):41-52, 1986.

**Classroom system**

Induction loop listening system designed for a classroom. Letowski TR, et al. 23(1):63-69, 1986.

**LOCOMOTION****FES-stimulated leg propulsion**

Locomotion via paralyzed leg muscles: Feasibility study for a leg-propelled vehicle. Glaser RM, et al. 20(1):87-92, 1983. (A Technical Note)

**Measuring blind traveler's gait**

Measuring gait-related blind mobility performance. Hollyfield RL, et al. 22(3):66-74, 1985.

**Muscular synergy, patterns in**

Electromyographic patterns in adult locomotion: A comprehensive review. Shiavi R. 22(3):85-98, 1985.

*Purpose:* An attempt to coalesce all of the known results into an informational base on locomotor EMG in adults. It is not intended to be a kinesiology review, the author states.

*Goal:* To foster and support the development of standards for research results and creation of a common data base for all investigators in the field.

*Method:* pattern variations in the literature are discussed and analyzed, standard terminology is reviewed, and the need for time-base and amplitude normalization is supported in the author's conclusion.

*Patterns discussed:* Intrinsic muscles of the foot; ankle dorsiflexors; ankle plantarflexors; anterior thigh musculature; posterior thigh musculature, popliteus; hip joint musculature; and trunk musculature.

**M****MATERIALS AND PRODUCTS****Bone interfacing biomaterials**

A future prosthetic limb device. Hall CW. 22(3):99-102, 1985.

**Key references in biomaterials**

Bone/biomaterial interface in orthopedic joint implants. Gruen TA, et al. 23(2):59-77, 1986.

**Cushion life-span study**

The influence of environmental aging upon the load-bearing properties of polyurethane foams. Noble PC, et al. 21(2):31-38, 1984.

**Discussion (Wheelchairs)**

Wheelchair development, standards, progress and issues: A discussion with Colin McLaurin, Sc.D. 23(2):48-51, 1986.

**Foam shoe insole materials**

Compressive behavior after simulated service conditions of some foamed materials intended as orthotic shoe insoles. Campbell GJ, et al. 21(2):57-65, 1986. (A Technical Note)

**Foot, prosthetic, keel for**

Development and preliminary evaluation of the VA Seattle Foot. Burgess EM, et al. 22(3):75-84, 1985.

**Polyurethane tires for wheelchairs**

Wheelchair tire rolling resistance and fatigue. Kauzlarich JJ, et al. 22(3):25-41, 1985.

**Rubber tires for wheelchairs, solid**

Wheelchair tire rolling resistance and fatigue. Kauzlarich JJ, et al. 22(3):25-41, 1985.

**Skin-interfacing biomaterials**

A future prosthetic limb device. Hall CW. 22(3):99-102, 1985. (A Technical Note)

**Sodium fluorescein (dye)**

Fluorometric prediction of successful amputation level in the ischemic limb. Silverman DG, et al. 22(1):23-28, 1985.

**Tactaid vibrotactile aid**

Vibrotactile stimulation: Case study with a profoundly deaf child. Geers AE. 23(1):111-117, 1986.

**Telephones and hearing aid telecoil couplings**

Inductive coupling of hearing aids and telephone receivers. Stoker RG, et al. 23(1):71-78, 1986.

**Tires for wheelchairs, engineering of**

Wheelchair tire rolling resistance and fatigue. Kauzlarich JJ, et al. 22(3):25-41, 1985.

**MULTIPLY HANDICAPPED****Verbal communication for**

Microprocessor-based communications system for the nonverbal person with serious motor handicaps: A preliminary report. Pollak IV. 19(1):7-17, 1982.

*Access:* special interface provides big (2-inch) depressed keys: more severely handicapped use sip-and-puff, etc.

*Vocabulary:* (N=1000) words stored in 3x3 matrix stacked on three levels.

*Design:* exploits relatively low-cost small personal computer with CRT display.

**Words for a nonspeaking paralyzed patient**

A new communications technique for the nonverbal person, using the Apple II computer. Seamone W. 19(1):28-33, 1982. (A Technical Note)

**MUSCLES****Audiomyofeedback device tested**

A myofeedback instrument for clinical use. McCarthy CF, et al. 21(2):39-44, 1984.

**EMG patterns in locomotion**

Electromyographic patterns in adult locomotion: A comprehensive review. Shiavi R. 22(3):85-98, 1985.

**Gait, synthesis of, via FES**

Gait restoration in paraplegic patients: A feasibility demonstration using multichannel surface electrode/FES. Kralj A, et al. 20(1):3-20, 1983.

**Multistate control, single site**

Multistate myoelectric control: The feasibility of five-state control. Richard PD, et al. 20(1):84-86, 1983.

**Strengthening for gait in paraplegia**

Gait restoration in paraplegic patients: A feasibility demonstration using multichannel surface electrode/FES. Kralj A, et al. 20(1):3-20, 1983.

**Strengthening paralyzed muscle**

A system for evaluation and exercise-conditioning of paralyzed leg muscles. Gruner JA, et al. 20(1):21-30, 1983.

**Synergy patterns in locomotion**

Electromyographic patterns in adult locomotion: A comprehensive review. Shiavi R. 22(3):85-98, 1985.

More detail in entry for this paper under **LOCOMOTION**

**N****NOMENCLATURE****Definitions of words: Disability, handicap, etc.**

Spinal cord injury: A prototype "system" model for the prevention and control of severe disability. Spencer WA, et al. 21(2):2-9, 1984.

**NONVOCAL****Word communication for multiply handicapped**

Microprocessor-based communications system for the nonverbal person with serious motor handicaps: A preliminary report. Pollak IV. 19(1):7-17, 1982.

**NUTRITION****In paraplegia**

Assessment of nutritional and metabolic status of paraplegics. Lee BY, et al. 22(3):11-17, 1985.

**O****OPTACON****Reading aid, tactual, printed braille**

Text-scanning patterns of blind readers using Optacon and braille. Hislop, et al. 22(3):54-65, 1985.

## ORIENTATION AND MOBILITY

### Assessing results of training

Measuring gait-related blind mobility performance. Hollyfield RL, et al. 22(3):66-74, 1985.

### Measuring blind traveler's performance

Measuring gait-related blind mobility performance. Hollyfield RL, et al. 22(3):66-74, 1985.

More detail with entry of this paper under VISUAL IMPAIRMENT

## ORTHOTICS

### Knee motion accurately reproduced

External knee joint design based on normal motion. Walker PS, et al. 22(1):9-22, 1985.

*Subjects:* Healthy males (N=8) aged 23 to 41 years, supplementing 14 fresh cadavers.

*Objectives:* To determine three-dimensional knee motion with respect to readily identifiable bony landmarks, and to use the data to design the external joints.

## P

## PARAPLEGIA

### Curb-climbing aid for wheelchairs

Evaluation of a curb climbing aid for manual wheelchairs: Considerations of stability, effort, and safety. Szeto AYJ, et al. 20(1):45-56, 1983.

### FES-stimulated legs propel wheelchair

Locomotion via paralyzed leg muscles: Feasibility study for a leg-propelled vehicle. Glaser RM, et al. 29(1):87-92, 1983. (A Technical Note)

### Leg-propelled vehicle

A system for evaluation and exercise-conditioning of paralyzed leg muscles. Gruner JA, et al. 20(1):21-30, 1983.

## Metabolic and endocrine disorders

Assessment of nutritional and metabolic status of paraplegics. Lee BY, et al. 22(3):11-17, 1985.

### Weightbearing test platform

Measurement of weightbearing during standing. Poyzdala JJ, et al. 21(2):46-49, 1984.

### Wheelchair side-slope problem

Effects of side slope on wheelchair performance. Brubaker CE, et al. 23(2):55-57, 1986. (A Technical Note)

## PRESSURE ON FLESH

### Buttock/cushion measurements

Evaluation of transducer performance for buttock/cushion interface pressure measurements. Reddy NP, et al. 21(1):43-50, 1984.

### Cushion life-span study

The influence of environmental aging upon the load-bearing properties of polyurethane foams. Noble PC, et al. 21(2):31-38, 1984.

*Cushion foams stored in the open, with and without covers, reveal pattern of loss of ability to support weight, even in absence of compression.*

### Defect in the system

Comments on the article: "The effectiveness of preventive management in reducing the occurrence of pressure sores." Brand PW. 20(1):73, 1983.

### Orthotic shoe insoles

Compressive behavior after simulated service conditions of some foamed materials intended as orthotic shoe insoles. Campbell GJ, et al. 21(2):57-65, 1984. (A Technical Note)

### Review of the literature

The effectiveness of preventive management in reducing the occurrence of pressure sores. Krouskop TA. 20(1):74-83, 1983. (For literature review, see Appendix, p. 77-78)

## PRESSURE SORES

### Prevention programs

Effectiveness of mattress overlays in reducing interface pressures during recumbency. Krouskop TA, et al. 22(3):7-10, 1985.

## PROSTHESES

### Cochlear, for profound deafness

Nucleus 22-channel cochlear implant: Preliminary observations. Hirshorn MS, et al. 23(2):27-33, 1986. (A Technical Note)

### Fitting of lower limb prostheses

Alignment of lower limb prostheses. Zahedi MS, et al. 23(2):2-19, 1986.

### Joint implants (bibliography)

Key references in biomaterials: Bone/biomaterials interface in orthopedic joint implants. Gruen TA, et al. 23(2):59-77, 1986. (A Bibliography)

### Processing strategy for prostheses

Nucleus 22-channel cochlear implant: Preliminary observations. Hirshorn MS, et al. 23(2):27-33, 1986.

## PROSTHETICS

### EPP control analyzed

An analysis of extended physiological proprioception as a prosthesis-control technique. Doubler JA, et al. 21(1):5-18, 1984.

*Purpose:* "This research was devoted to an investigation of the practicality and potential effectiveness of applying EPP to the control of upper limb prostheses."

*Prosthesis control...* implemented by providing a man/prosthesis interface in which the signals pertaining to prosthesis operation are coded in terms natural to the residual sensory and neuromuscular systems of the amputated limb.

### EPP upper-limb control applied

Design and evaluation of a prosthesis control system based on the concept of extended physiological proprioception. Doubler JA, et al. 21(1):19-31, 1984.

*Subjects:* non-amputees performed random tracking and blind-positioning experiments.

*Design:* Liberty Mutual Elbow and Northwestern University Wrist were the powered components of the experimental shoulder-disarticulation prosthesis assembled for this research.

*Results:* "...clearly demonstrated improved control effectiveness that can be achieved with EPP control..."

### Fabrication system

Scotchcast® PVC interim prosthesis for below-knee amputees. Wu Y, et al. 18(2):40-45, 1981. (A Technical Note)

*Subject:* (N=25) including two bilateral BK amputees. Longest period of use was 90 days.

*Casting* the PTB socket and *aligning* the PVC-pylon leg are described and illustrated.

*Features:* Fabrication reduced to "often less than 2 hours," simplified alignment, light weight, comfort for new amputees awaiting a first training leg.

### Foot, prosthetic

Development and preliminary evaluation of the VA Seattle Foot. Burgess EM, et al. 22(3):75-84, 1985.

*Design criteria:* Initially designed to allow the amputee to run and engage in sports; not necessarily contraindicated for less-active amputees.

*Engineering description:* Foam in the general shape of a human foot: encloses a monolithic composite keel engineered to store potential energy and release kinetic energy.

*Acceptance clinical testing:* Subjects (N=36) are all previous prosthesis users with interest in sports and physical development.

*Current VA test program:* Subjects (N=500) volunteer amputees in 44 VA Medical Centers. Also commercial evaluation program using several hundred feet supplied to prosthetists nationwide.

### **Knee joint replacement**

The wear-particles of synovial fluid: Their ferrographic analysis and pathophysiological significance. Evans CH, et al. 18(2):13-26, 1981. (A Technical Note)

### **Lower-limb prostheses**

Alignment of lower limb prostheses. Zahedi MS, et al. 23(2):2-19, 1986.

*Subject:* (N=20) 10 BK and 10 AK amputees, all established, active prosthesis wearers. A total of 283 fittings were made on this group of subjects.

*Objectives:* Repeatability of achieving optimum alignment in a clinical setting was primary concern. A second area of interest was range of alignments acceptable to patients.

*Sockets tested:* BKs were PTB with supracondylar strap suspension; AKs were quadrilateral total-contact suction sockets with uniaxial knee mechanism and constant-friction swing-phase control. All used SACH feet, Otto Boch limbs.

### **Monitoring joint prosthetic or natural**

The wear-particles of synovial fluid: Their ferrographic analysis and pathophysiological significance. Evans CH, et al. 18(2):13-26, 1981. (A Technical Note)

### **Myoelectric control of prostheses**

Digital approaches to myoelectric state control of prostheses. Philipson, et al. 18(2):3-11, 1981.

*Subjects:* (N=3) Below-elbow amputees, adult males.

*Design:* Three-state proportional control via micro-computer processing of EMG signals.

*Simulation:* Microcomputer-based device was developed to allow different control algorithms to be examined by changes in computer program instead of in hardware.

### **San Francisco Bay Area amputees**

Evaluation of problems and needs of veteran lower-limb amputees in the San Francisco Bay Area during the period 1977-1980. Hoaglund FT, et al. 20(1): 57-71, 1983.

### **Single-muscle five-state control**

Multistate myoelectric control: The feasibility of five-state control. Richard PD, et al. 20(1):84-86, 1983.

*Subject:* Non-amputees (N=7) and amputee, female subject with (N=1) congenital left terminal transverse hemimelia, short below-elbow, who is 48 years of age.

*Circuit:* Block diagram includes necessary feedback circuitry.

### **Skeletal attachment of artificial limbs**

A future prosthetic limb device. Hall CW. 22(3):99-102, 1985.

*Subjects:* Spanish goats.

*Comment on:* Research in permanently affixing artificial limbs directly to the skeletal member of the amputated residual limb.

*Bone-interfacing* biomaterials and methods discussed.

*Skin-interfacing* biomaterials and problems discussed.

### **Upper-limb fitting "as soon as possible"**

Immediate, early, and late postsurgical management of upper limb amputation. Malone JM, et al. 21(1):33-41, 1984.

*Subjects:* (N=47) Amputees of the authors' experience and (N=142) amputees encountered in a review of the literature 1969-1981.

*Purpose:* To analyze the impact of rapid post-operative fitting on upper limb amputation, and to assess general prosthetic prescription and guidelines for upper limb amputees.

## **Q**

### **QUADRIPLEGIA**

#### **Electric wheelchairs**

Automatic transmission for electric wheelchairs. Reswick JB. 22(3):42-51, 1985.

#### **FES-stimulated legs propel wheelchair**

Locomotion via paralyzed leg muscles: Feasibility study for a leg-propelled vehicle. Glaser RM, et al. 20(1):87-92, 1983. (A Technical Note)

**Lever wheelchair potential**

Lever drive system for wheelchairs. McLaurin CA, et al. 23(2):52-54, 1986. (A Technical Note)

**Multiply handicapped communication system**

Microprocessor-based communications system for the non-verbal person with serious motor handicaps. Pollak IV. 19(1):7-17, 1982.

**Pressure-on-flesh measurements**

Evaluation of transducer performance for buttock/cushion interface pressure measurements. Reddy NP, et al. 21(1):43-50, 1984.

**Prospective driver evaluation**

A simulator for objectively evaluating prospective drivers of the Scott Van. Hogan HA, et al. 19(1):19-27, 1982.

**Robotic arm/worktable evaluated**

Early clinical evaluation of a robot arm/worktable system for spinal cord injured persons. Seamone W, et al. 22(1):38-57, 1985.

**Van control simulator**

A simulator for objectively evaluating prospective drivers of the Scott Van. Hogan HA, et al. 19(1):19-27, 1982.

**Wheelchair batteries tested**

Wheelchair batteries: driving cycles and testing. Kauzlarich JJ, et al. 20(1):31-43, 1983.

**R****REHABILITATION****Behavioral vital signs**

Functional assessment: An annotated bibliography. Allen L, et al. 23(2):78-85, 1986. (Reprinted from "Interconnector" 8(1) January 1985, UCIR, Michigan State University, East Lansing, MI)

**Definitions of disability, handicap, etc.**

Spinal cord injury: A prototype "System" model for the prevention and control of severe disability. Spencer WA, et al. 21(2):2-9, 1984.

**Device and system evaluation**

The new evaluation unit of the Veterans Administration's Rehabilitation Research and Development Service. Reswick JB. 22(1):31-34, 1985.

**The engineer on the clinical team**

Comments for a new generation of rehabilitation engineers. Foort J. 22(1):2-8, 1985. (A Guest Editorial)

**Interdisciplinary introduction to hearing impairment**

Hearing impairment and sensory aids: A tutorial review. Levitt H. 23(1):xiii-xviii, 1986.

**Microcomputer impact on**

The practical use of microcomputers in rehabilitation. Vanderheiden GC. 19(1):1-5, 1982. (A Guest Editorial)

*Design attitude:* "Microcomputers represent a pre-made and mass-produced function-block around which specialized aids can be constructed."

*Workplace effects:* Include reducing the disadvantage represented by some sensory and physical deficits, the author reports.

**Portable audio-myofeedback device**

A myofeedback instrument for clinical use. McCarthy CF, et al. 21(2):39-44, 1984.

**Prototype system**

Spinal cord injury: A prototype "system" for the prevention and control of severe disability. Spencer WA, et al. 21(2):2-9, 1984. (A Guest Editorial)

**Training for hearing aid users**

Some rehabilitative considerations for future speech-processing hearing aids. Revoile SG, et al. 23(1):89-94, 1986.

**Value of prompt prosthetic fitting**

Immediate, early, and late postsurgical management of upper limb amputation. Malone JM, et al. 21(1):33-41, 1984.

**RESEARCH****Discussion (Wheelchairs)**

Wheelchair development, standards, progress, and issues: A discussion with Colin McLaurin, Sc.D. 23(2):48-51, 1986.

**Side-slope effect on wheelchairs**

Effects of side slope on wheelchair performance. Brubaker CE, et al. 23(2):55-57, 1986. (A Technical Note)

**Strategy to exploit technology**

The road ahead: More attention to research strategy will be needed if veterans are to benefit as they should from our blossoming technology and science. Burgess EM. 21(2):10-13, 1984. (A Guest Editorial)

**VA priorities in research**

Research on what? Todd SP, Jr., et al. 21(1):2-3, 1984. (An Editorial)

**VA Rehab R&D, new unit**

The new evaluation unit of the Veterans Administration's Rehabilitation Research and Development Service. Reswick JB. 22(1):31-34, 1985.

**VA role in reading machine research**

Evolution of reading machines for the blind: Haskins Laboratories' research as a case history. Cooper FS, et al. 21(1):51-87, 1984 (A Special Article, historical).

**S****SEATING****Cushion prescription strategies**

The effectiveness of preventive management in reducing the occurrence of pressure sores. Krouskop TA. 20(1):74-83, 1983. (See Appendix, pp. 78-83.)

**Pressure on flesh**

Skin blood flow changes and tissue deformations produced by cylindrical indentors. Sacks, et al. 22(3):1-6, 1986.

(More detail at this paper's entry under **SPINAL CORD INJURY**)

**SENSORY AIDS (See also HEARING IMPAIRMENT, VISUAL IMPAIRMENT)****Listening systems compared**

Comparison of amplification systems in a classroom. Nabelek AK, et al. 23(1):41-52, 1986.

**VA research priorities**

Research on what? Todd SP, Jr., et al. 21(1):2-3, 1984. (An Editorial)

**SKIN BLOOD FLOW****Measurement method evaluated**

Fluorometric prediction of successful amputation level in the ischemic limb. Silverman DG, et al. 22(1):23-28, 1985.

**Seating: Pressure on flesh**

Skin blood flow changes and tissue deformations produced by cylindrical indentors. Sacks, et al. 22(3):1-6, 1985.

(More detail at this paper's entry under **SPINAL CORD INJURY**)

**SOCKETS****Lower limb prostheses**

Alignment of lower limb prostheses. Zahedi MS, et al. 23(2):2-19, 1986.

**SPEECH****Critical segments for recognition**

Some rehabilitative considerations for future speech-processing hearing aids. Revoile SG, et al. 23(1):89-94, 1986.

**Enhancement of by hearing aids**

Some rehabilitative considerations for future speech-processing hearing aids. Revoile SG, et al. 23(1):89-94, 1986.

**Feature extraction for cochlear prosthesis**

Nucleus 22-channel cochlear implant: Preliminary observations. Hirshorn MS, et al. 23(2):27-33, 1986. (A Technical Note)

**Perception in noise and reverberation**

Speech perception through FM auditory trainers in noise and reverberation. Picard M, et al. 23(1):53-62, 1986.

**Processing by hearing aids**

Some rehabilitative considerations for future speech-processing hearing aids. Revoile SG, et al. 23(1):89-94, 1986.

**Processing strategy for prosthesis**

Nucleus 22-channel cochlear implant: Preliminary observations. Hirshorn MS, et al. 23(2):27-33, 1986. (A Technical Note)

**Speech-analyzing tactile aid**

Tracking skill of a deaf person with long-term tactile aid experience: A case study. Cholewiak RW, et al. 23(2):20-26, 1986.

**Temporal cue enhancement**

Some rehabilitative considerations for future speech-processing hearing aids. Revoile SG, et al. 23(1):89-94, 1986.

**Training the deaf to produce speech**

The use of visual and tactile aids in speech production training: A preliminary report. McGarr NS, et al. 23(1):101-109, 1986.

**Typical speech spectra for sensorineural hearing impairment (diagram and comment)**

Hearing impairment and sensory aids: A tutorial review. Levitt H. 23(1):xiii-xviii, 1986.

**SPINAL CORD INJURY****Computer provides words**

A new communications technique for the nonverbal person, using the Apple II computer. Seamone W. 19(1):28-33, 1982. (A Technical Note)

*Design:* Unmodified computer running "Visicalc"® offers more than 30 wpm.

*Input means:* Johns Hopkins University/Applied Physics Lab. Interface card. Generates full ASCII character set from Morse code input.

**Electric wheelchair, automatic transmission for**

Automatic transmission for electric wheelchairs. Reswick JB. 22(3):42-51, 1985.

**Experience with the "Center" and "System" concept**

Spinal cord injury: A prototype "System" model for the prevention and control of severe disability. Spencer WA, et al. 21(2):2-9, 1984.

*Definitions and background:* The "center" and its place in a "system."

*"Regional center" concept:* Evolution and difficulties in establishing one.

**FES-stimulated legs drive wheelchair**

Locomotion via paralyzed leg muscles: Feasibility study for a leg-propelled vehicle. Glaser RM, et al. 20(1):87-92, 1983. (A Technical Note)

*Subjects:* (N=6) Two quadriplegic and four paraplegic subjects.

*FES-restored leg muscle strength* and endurance applied to locomotion.

**Gait, restoration of**

Gait restoration in paraplegic patients: A feasibility demonstration using multichannel surface electrode/FES. Kralj A, et al. 20(1):3-20, 1983.

*Subjects:* (N=17): Results for three receive individual comment in detail.

*Patients:* Selection criteria covered on pp. 5-6, 12.

*Synthesis of gait:* Timing and coordination of FES sequences; trunk maneuvers; role of patient-initiated events; role of reflex events.

*Muscle re-strengthening* via FES.

*Patient control of FES gait* in walking frame and roller walker; muscle strengthening via FES by patients at home.

**Gait, Synthesis of; See Gait, Restoration of****Lever W/C potential**

Lever drive system for wheelchairs. McLaurin CA, et al. 23(2):52-54, 1986. (A Technical Note)

**Mattresses, pressure on flesh**

Effectiveness of mattress overlays in reducing interface pressures during recumbency. Krouskop TA, et al. 22(3):7-10, 1985.

*Subjects:* (N=30) Male and female, thin, average, and obese.

*Products:* Seven mattress overlays.

*Evaluation* was accomplished through the use of the Texas Interface Pressure Evaluator (TIPE).

## Nutritional Assessment

Assessment of nutritional and metabolic status of paraplegics. Lee BY, et al. 22(3):11-17, 1985.

*Subjects:* (N=17) Healthy males with chronic paraplegia who had completed their rehabilitation programs and were receiving regular diet.

*Malnutrition:* "Mild-to-moderate" malnutrition was exhibited by all patients. . . "objective evidence of severe malnutrition was lacking. . ."

*The authors conclude:* "Problems associated with overfeeding and underfeeding of spinal cord injured patients can be prevented by a more precise definition of their caloric requirement."

## Predicting driving ability

Aid for training and evaluation of handicapped drivers. Reger SI, et al. 18(2):35-39, 1981. (A Technical Note)

## Pressure on flesh

The effectiveness of preventive management in reducing the occurrence of pressure sores. Krouskop TA. 20(1):74-83, 1983.

*Clinical background* since 1975, pp. 74-77 (Appendix).

*Clinic:* Individual patient and multidisciplinary team relationship.

*Results:* Human, medical, financial, over the last 6 years. Cushion prescription strategies are detailed in Appendix, pp. 78-83.

## Pressure on flesh

Comments on the article: "The effectiveness of preventive management in reducing the occurrence of pressure sores." Brand PW. 20(1):73, 1983.

*Discusses the influence* of such variables as education and staff/patient interaction in the results of prevention programs.

*Suggests the reasons* for the failure to publish data on programs where results obtained depend on "uncontrollable variables."

## Pressure-on-flesh measurements

Evaluation of transducer performance for buttock/cushion interface pressure measurements. Reddy NP, et al. 21(1):43-50, 1984.

## Prevention and control of disability

Spinal cord injury: A prototype "system" for the pre-

vention and control of severe disability. Spencer WA, et al. 21(2):2-9, 1984. (A Guest Editorial)

## Robotic arm/worktable evaluated

Early clinical evaluation of a robot arm/worktable system for spinal cord injured persons. Seamone W, et al. 22(1):38-57, 1985.

## Seating: Pressure on flesh

Skin blood flow changes and tissue deformations produced by cylindrical indentors. Sacks, et al. 22(3):1-6, 1985.

*Subjects:* (N=4), Male, two able-bodied and two with paraplegia.

*Dimensional analysis:* Derivation of a mathematical expression of the effective relationship between skin blood flow and tissue response to loading.

*Authors suggest a relationship* by which skin blood flow measurements are best presented.

## Self-feeding robotic system

Early clinical evaluation of a robot arm/worktable system for spinal cord injured persons. Seamone W, et al. 22(1):38-57, 1985.

## Simple driving simulator

A simulator for objectively evaluating prospective drivers of the Scott Van. Hogan HA, et al. 19(1):19-27, 1982.

*Subjects:* Able-bodied (N=25) as controls: 13 of these also received driving test.

Severely physically handicapped (N=9) quadriplegics with partial upper limb loss: all of these received simulator and driving tests.

*Design:* Simulator provides tracking-task test on same uni-lever servocontrol configuration installed in Scott Van.

*Results:* ". . . the simulator T-scores of the handicapped subjects correlated very well with their driving. . . T-scores."

## Strengthening muscles by FES

A system for evaluation and exercise-conditioning of paralyzed leg muscles. Gruner JA, et al. 20(1):21-30, 1983.

*Subjects:* With paraplegia (N=2) males; with quadriplegia (N=4) males and females.

*Purpose:* Development of instrumentation and protocols in which FES is used to induce exercise in

paralyzed quadriceps muscles, for strength and endurance evaluation, and for conditioning.

*Leg-conditioning system* is described which simulates a leg-propelled vehicle (LPG) resembling a wheelchair: System serves to test and prepare paraplegic patients for possible use of such a vehicle.

*Safety and risk emphasized:* Requirements for minimizing risk to subjects performing this type of exercise are strongly emphasized.

### **Weightbearing test platform**

Measurements of weightbearing during standing. Poyezdala JJ, et al. 21(2):46-49, 1984. (A Technical Note)

*Subjects:* Have included paraplegic individuals standing quietly by means of conventional orthoses and by FES stimulation of the quadriceps.

*Device* was built to continuously monitor, display, and output or record the weight borne by each of the lower extremities of disabled individuals while standing.

### **Wheelchair batteries tested**

Wheelchair batteries: Driving cycles and testing. Kauzlarich JJ, et al. 20(1):31-43, 1983.

### **Wheelchair caster shimmy cure**

Wheelchair caster shimmy and turning resistance. Kauzlarich JJ, et al. 21(2):15-29, 1984.

### **Wheelchairs (discussion)**

Wheelchair development, standards, progress, and issues: A discussion with Colin McLaurin, Sc.D. 23(2):48-51, 1986.

### **Wheelchairs, electric**

Veterans Administration Standards for Electrically Powered Wheelchairs. Reprinted from the Federal Register of Tuesday, December 15, 1981. 19(1):130-138, 1982.

### **Wheelchair side-slope effect**

Effects of side slope on wheelchair performance. Brubaker CE, et al. 23(2):55-57, 1986. (A Technical Note)

### **Wheelchair tire design**

Wheelchair tire rolling resistance and fatigue. Kauzlarich JJ, et al. 22(3):25-41, 1985.

## **SPORTS FOR AMPUTEES**

### **The need for amputees to run**

Development and preliminary evaluation of the VA Seattle Foot. Burgess EM, et al. 22(3):75-84, 1985.

## **STANDARDS**

### **VA standards for electric wheelchairs**

Veterans Administration Standards for Electrically Powered Wheelchairs. Reprinted from Federal Register of December 15, 1981 (Vol. 46, No. 240). 19(1):130-138, 1982.

### **Wheelchairs (discussion)**

Wheelchair development, standards, progress, and issues: A discussion with Colin McLaurin, Sc.D. 23(2):48-51, 1986.

## **T**

## **TACTILE AIDS**

### **Evaluation, word identification**

Continuing evaluation of the Queen's University tactile vocoder. 1: Identification of open set words. Brooks PL, et al. 23(1):119-128, 1986.

### **Evaluation, sentence identification**

Continuing evaluation of the Queen's University tactile vocoder. 2: Identification of open set sentences and tracking narrative. Brooks PL, et al. 23(1):129-138, 1986.

### **Printed braille, tactile output**

Inkbraille as a potential new reading system for the blind. Hislop DW, et al. 21(2):54-57, 1984. (A Technical Note)

### **Reading aids, tactual**

Text-scanning patterns of blind readers using Optacon and braille. Hislop DW, et al. 22(3):54-65, 1985.

**Single-channel and eight-channel systems compared**

Lipreading with tactile supplements. Boothroyd A, et al. 23(1):139-146, 1986.

**Speech communication aids reviewed**

Speech communication for the deaf: Visual, tactile, and cochlear-implant. Pickett JM. 23(1):95-99, 1986. (A review of current electronic-device R&D)

**Speech and language development with**

Vibrotactile stimulation: Case study with a profoundly deaf child. Geers AE. 23(1):111-117, 1986.

**Training the deaf to produce speech**

The use of visual and tactile aids in speech production training: A preliminary report. McGarr NS, et al. 23(1):101-109, 1986.

**Wearable two-output-channel aid**

Tracking skill of a deaf person with long-term tactile aid experience: A case study. Cholewiak RW, et al. 23(2):20-26, 1986.

**TRACKING****Evaluating a tactile aid by tracking**

Continuing evaluation of the Queen's University tactile vocoder. 2: Identification of pen set sentences and tracking narrative. Brooks PL, et al. 23(1):129-138, 1986.

**Hearing aid evaluation**

Evaluation of a cochlear prosthesis using Connected Discourse Tracking. Levitt H, et al. 23(1):147-154, 1986.

**Trilingual subject**

Tracking skill of a deaf person with long-term tactile aid experience: A case study. Cholewiak RW, et al. 23(2):20-26, 1986.

**TRAINING****... hearing aid users, for use of enhanced sound**

Some rehabilitative considerations for future speech-processing hearing aids. Revoile SG, et al. 23(1):89-94, 1986.

**U****ULCERS****Plantar foot**

Walking casts: Effect on plantar foot pressures. Birke JA, et al. 22(3):18-22, 1985.

**V****VETERANS****Benefits from science and technology?**

The road ahead: More attention to research strategy will be needed if veterans are to benefit as they should from our blossoming technology and science. Burgess EM. 21(2):10-13, 1983. (A Guest Editorial)

**Hearing aids for (Australian)**

Performance requirements for hearing aids. (A Special Article) Dillon H, et al. 23(1):1-15, 1986.

**Lower limb amputees' problems**

Evaluation of problems and needs of veteran lower limb amputees in the San Francisco Bay Area during the period 1977-1980. Hoaglund FT, et al. 20(1):57-71, 1983.

**VETERANS ADMINISTRATION****Rehab R&D Service, new unit**

The new evaluation unit of the Veterans Administration's Rehabilitation Research and Development Service. Reswick JB. 22(1):31-34, 1985.

**VA research priorities**

Research on what? Todd SP, Jr., et al. 21(1):2-3, 1984. (An Editorial)

**VISUAL AIDS****Training the deaf to produce speech**

The use of visual and tactile aids in speech production

training: A preliminary report. McGarr NS, et al. 23(1):101-109, 1986.

## VISUAL IMPAIRMENT

### Mobility data generator

Qualitative and quantitative gait phase analysis by continuous monitoring of inter-ankle distance. Pinzur MS, et al. 21(2):50-53, 1984.

### Mobility with visual impairment, measured

Measuring gait-related blind mobility performance. Hollyfield PL, et al. 22(3):66-74, 1985.

*Subjects:* (N=10) Five blind (long-cane experienced) and five sighted subjects, all of average height.

*Ultrasonic measurement of inter-ankle distance* provides data which can be analyzed to give information about gait of blind subject negotiating a test route.

*Results* suggest the system is useful as an assessment device in research and in rehabilitation training, the authors report.

### Printed braille, tactile output

Inkbraille as a potential new reading system for the blind. Hislop DW, et al. 21(2):54-57, 1984. (A Technical Note)

### Reading aids, tactual

Text-scanning patterns of blind readers using Optacon and braille. Hislop DW, et al. 22(3):54-65, 1985.

*Subjects:* (N=20) Adult blind subjects who were proficient braille readers; age range was from early twenties to mid-sixties; all were college graduates.

*Text scanning patterns* for four modes of tactual reading were recorded: embossed braille one-hand; embossed braille two-hand; Optacon/letterprint; and Optacon/inkbraille.

*Recording* of text-scanning behavior was accomplished by detecting instantaneous position of an LED attached to reader's index finger or to Optacon camera.

### Reading machine research history

Evolution of reading machines for the blind: Hasking Laboratories' research as a case history. Cooper FS, et al. 21(1):51-87, 1984. (A Special Article, historical)

How more than 20 years of research (1956-1978)

with VA support contributed to solving the reading machine problem.

Three major research laboratories (Battelle, Mauch, and Haskins) under VA contracts, aimed at "arbitrary acoustic signal," "spelled speech," and "speech-like output" systems, respectively.

## W

## WHEELCHAIRS

**Automatic transmission for:** See WHEELCHAIRS, Electric

### Battery type comparison

Wheelchair batteries: Driving cycles and testing. Kauzlarich JJ, et al. 20(1):31-43, 1983.

*Battery performance of actual wheelchairs* was measured under typical indoor and outdoor conditions. This data was used to derive simulated driving cycles.

*Simulated driving cycles* were used to bench-test four types of wheelchair batteries under various conditions.

*Mathematical methods* of calculating battery performance for specific fluctuating driving cycle, and for selecting most economical battery size for a given daily use cycle, appear in an appendix to this article.

### Caster shimmy cure found

Wheelchair caster shimmy and turning resistance. Kauzlarich JJ, et al. 21(2):15-29, 1984.

*Theory and performance* of single-wheel casters for a variety of tires, and a new design (patent pending) using a grooved dual-tread tire or co-rotating caster wheels.

*Design:* Derivation of equations for caster shimmy are presented.

### Curb climbing aid evaluated

Evaluation of a curb climbing aid for manual wheelchairs: Considerations of stability, effort, and safety. Szeto AYJ, et al. 20(1):45-56, 1983.

*Subjects:* Able-bodied (N=18); paraplegic (N=4); and partial C4-C6 quadriplegic (N=1).

*Laboratory evaluation:* Theoretical calculations and experimental methods, "tipover angles" and slippage.

#### **Cushion life-span study**

The influence of environmental aging upon the load-bearing properties of polyurethane foams. Noble PC, et al. 21(2):31-38, 1984.

#### **Design for the engineer**

Wheelchair tire rolling resistance and fatigue. Kauzlarich JJ, et al. 22(3):25-41, 1985.

*Purpose:* To give the rehabilitation engineer the means for dealing with rolling resistance and fatigue life in the design of wheelchair tires, or in assessing the characteristics of new tire designs or a change in tire materials.

*Materials:* Cured and reinforced natural rubber ("gray rubber") and polyurethane.

*Author studies* rolling resistance of solid "airless" type tires; derives equations for calculating rolling resistance of solid tires and compares theoretical with test data.

#### **Discussed with Colin McLaurin**

Wheelchair development, standards, progress, and issues: A discussion with Colin McLaurin, Sc.D. (with questions by the Editors of the Journal). 23(2):48-51, 1986.

#### **Electric wheelchairs, transmission for**

Automatic transmission for electric wheelchairs. Reswick JB. 22(3):42-51, 1985.

*Test vehicle:* Three-wheeled commercially available electric wheelchair driven by a single motor and intended for indoor or outdoor use.

*Test results:* Substantial reduction in operating

current and increased distance of operation over a test course, compared with the wheelchair's performance without the automatic transmission, are described.

"*Resatran*" (Patent pending) is an automatic torque-responsive variable-speed-ratio transmission prototype designed by the author.

#### **FES-stimulated leg propulsion**

Locomotion via paralyzed leg muscles: Feasibility study for a leg-propelled vehicle. Glaser RM, et al. 20(1):87-92, 1983. (A Technical Note)

#### **Leg-propelled vehicle for paraplegia**

A system for evaluation and exercise-conditioning of paralyzed leg muscles. Gruner JA, et al. 20(1):21-30, 1983.

#### **Lever drive potential**

Lever drive system for wheelchairs. McLaurin CA, et al. 23(2):52-54, 1986. (A Technical Note)

#### **Side-slope effects studied**

Effects of side slope on wheelchair performance. Brubaker CE, et al. 23(2):55-57, 1986. (A Technical Note)

#### **VA Standards, electrically powered wheelchairs**

Veterans Administration Standards for Electrically Powered Wheelchairs. Reprinted from Federal Register of Tuesday, December 15, 1981 (Vol. 46, No. 240). 19(1):130-138, 1982.

#### **Wheelchair controller runs worktable robot arm**

Early clinical evaluation of a robot arm/worktable system for spinal cord injured persons. Seamone W, et al. 22(1):38-57, 1985.