



AMERICAN COLLEGE OF  
RHEUMATOLOGY

*57th  
Annual Meeting*

MABS

Ferran Sun

# SCIENTIFIC ABSTRACTS

RENDR



AMERICAN COLLEGE  
OF RHEUMATOLOGY  
ARTHRITIS HEALTH  
PROFESSIONS  
ASSOCIATION

## POSTER SESSION B

Tuesday, November 9

7:30 AM - 10:00 AM and 2:45 PM - 3:45 PM

### Computer Applications

#### B1

**MULTIMEDIA ASSISTED TRAINING IN RHEUMATIC DISEASES - AN INTERNATIONAL APPROACH.** I. EXAMINATION. **A.D. Woplf**, Royal Cornwall Hospital, Truro, TR1 2HZ, UK; **T. Stolzmann**, Multimedia, Hannover, Germany; **H. Roberts**, Nottingham City Hospital, Nottingham, UK; **E. Liotta**, Hôpital Lariboisière, Paris, France; **P. Spukup**, Erfurt, Germany.

Rheumatic diseases are a major cause of morbidity and disability but in most countries little time is given to teaching them. Consequently most patients will be treated by primary care physicians who have little formal training in rheumatology. There are also inter-country differences in the management of rheumatic diseases and the need for harmonization is recognised in view of the increasing movement of clinicians. There is therefore a need for improved methods of teaching rheumatology at all levels that can be applied internationally. Multimedia education programmes are a new type of database that allow linking of video, still pictures, graphics and sound in an individual, interactive, problem-orientated format. DVI technology is a digital multimedia system that allows the compression of data as high as 150:1. This allows the retrieval of motion video from a standard CD-ROM and PC, and the mixing of different media as required. We have developed a multilingual training program in rheumatology for primary care physicians using this multimedia technology that is applicable in different countries to meet these educational needs. A problem-orientated interactive approach has been taken to encourage the clinical use of such a system. A program on examination of the musculoskeletal system is demonstrated.

Supported by a grant from SmithKline Beecham.

#### B2

**AN INTERACTIVE MULTIMEDIA COMPUTER-SYSTEM FOR PATIENT EDUCATION AND INFORMATION IN RHEUMATOLOGY.** **A.D. Woplf**, Royal Cornwall Hospital, Truro, TR1 2HZ, UK; **H. Zeidler**, MHH Hannover, Germany; **H. Berlink**, University of Giessen Bad Nauheim, Germany; **H. Bracke**, Sana-Klinik, Munich, Germany; **J. R. Kalden**, University of Erlangen, Germany; **E. Liotta**, Hôpital Lariboisière Paris; **J. Kacher**, Orthop. University Klinik Tübingen, Germany; **Th. Stolzmann**, Hannover, Germany.

Advanced data-processing technology (Multimedia) opens up new prospects for the transfer of information. This technology is being used to develop a medical consultation instrument to inform patients about general aspects of rheumatic diseases and of their therapies.

Multimedia software programs comprise motion video, audio and photographic information. The integration into a computer program allows direct access to the section of information that the user is individually interested in (interactive working). Several information sections can be connected according to pre-structured educational objectives. Thus an illustrative educational program can be constructed that is accessible according to the individuals need for information. The technology is based on a standard PC and is integrated into WINDOWS. The storage medium is a CD-ROM.

Two software programs with patient information on the most frequent rheumatic diseases and their possible therapies have been developed using video-sequences, animations, stills and explanatory comments. Access to the information sequences of the program is flexible, either by selecting pre-structured paths or via a keyword-index with control of the program by touch-screen or mouse. In this way the patient can learn about their disease in an interactive environment according to their individual need.

#### B3

**A COMPUTER BASED EDUCATIONAL PROGRAM TO ENHANCE THE QUALITY OF LIFE OF PATIENTS WITH ARTHRITIS.** **John A. Flynn, John Ujvari, Joe Hennessey, Elliot K. Fishman and David B. Hellmann** Johns Hopkins Medical Institutions, Baltimore, MD 21205

There is a great need to educate and assist patients with rheumatic diseases in an effort to improve their quality of life because: 1) rheumatic diseases afflict over 30 million Americans; and 2) these diseases have an enormous impact on the nations health. The goal of this project is to develop and subsequently evaluate a computer based educational program designed to enhance the quality of life of patients with rheumatic diseases who are medically and socially disadvantaged. This is designed to augment, not replace, existing resources.

Specific learner objectives have been developed in three areas: rheumatic disease education, medication knowledge and physical therapy reinforcement. A data base of educational material, involving multiple forms of media (text, voice instruction, photographic images, animations and video sequences) related to specific learning objectives is linked using existing computer software. The program runs on a Macintosh II which is user friendly and offers superior color graphics. Great emphasis has been placed on interface design such that the use of the program is intuitive. Learners can use the program at any time in a self-paced and self-directed fashion.

It is hoped that through the use of this program, which would be available in physicians offices and clinic areas, patients will have a better understanding of their disease process, medication and the importance of proper physical therapy techniques.

#### B4

**Visualization and Analysis of Rheumatic Disease Progression Over Time.** **Joseph Bormel, Philip Clements, Harold Paulus, Linda Ferguson** UCLA Los Angeles, CA 90024 for the Cooperative Systematic Studies of Rheumatic Diseases (CSSRD).

Recognizing significant patterns of disease progression in a large patient population over time is often difficult. We recently studied a cohort of patients containing eighteen disease subgroups which over time redistributed into 25 disease subgroups. We attempted to identify disease progression via transition paths between disease subgroups, which show the number of patients who eventually develop another disease versus those who remain in the same disease subgroup. We have developed a visual tool to view the progression of arthritis subgroups over time in terms of these transition paths.

Our initial representation of rheumatic disease course was a table of visit by visit patient subgroup sizes. This table did not convey a clear sense of our data due to the large number of cells, size disparity between adjacent rows and columns, sparseness and separation over multiple pages. To overcome this, a Visual Basic program was written to graphically represent the number of patients following each transition path. It was extended to allow interactive query of patient subpopulations by selection using a mouse pointing device. Based on this visual exploration of the data, the correlates of patients' disease transition (in our study the transition to disease remission) were subsequently studied in the traditional statistical manner with chi square, logistic and categorical models. The creation of this visual tool greatly streamlined the identification of relevant variables. It also allowed the results of complicated multivariate models to be summarized and presented to non-technical people.

We hope to extend this visualization tool to take advantage of the data sub-setting, modeling, reporting and expressivity capabilities of other existing tools. By specifically designing programs to facilitate analyses of rheumatic disease transition in populations over time, we can statistically and graphically investigate the relationships present with greater ease, speed and completeness than is possible with non-interactive, non-visual systems.

#### B5

**AUTOMATED MEDICAL RECORDS UTILIZING BAR CODE TECHNOLOGY FOR DATA ENTRY.** **Allan H. Morton, D.O.**, Warren, MI 48093.

Complete, accurate, and legible medical records are an important part of any medical practice. This author has developed a medical record keeping system for a rheumatology practice utilizing bar code technology for data entry. The system has been used in a private practice rheumatology office for the past three years with in excess of 20,000 patient encounters entered into the system.

By means of a bar code pen the author is able to generate prescriptions, progress notes, procedures, and x-ray interpretation. The progress notes consist of a history, physical examination (including the ability to generate a joint examination quantitating each individual joint 0-4+ for swelling, tenderness, or limitation of motion), diagnoses, joint injections, procedures ordered with medical justification, written and verbal instructions given to the patient, and clinical decision-making.

The system is very user friendly and can be changed or expanded very simply.

The computer system is marketed by microMedical, Inc.- Dr. Morton owns fifty per-cent of this company.

#### B6

**REMOIR: DEVELOPMENT AND VALIDATION OF AN EXPERT SYSTEM FOR INFLAMMATORY ARTHROPATHIES AND COLLAGEN DISEASES.** **Miguel A. Balboa**, Hospital General, 12004 Castellón, **Carlos Mirra, Ramón L. Martínez**, Centre d'Estudis Avançats, 17300 Sitges, **Ferran Sanz, Joan Sancho, María J. Miravet**, Sncr. Municipal Invest. Medica, 28003 Barcelona, Spain.

Medical expert systems (ES) are computer programs designed to help the physician in medical decision making. They are suitable especially for domains with high levels of uncertainty as is the case of rheumatology. We have been developing since 1987 REMOIR, a rule-based ES to aid the non-rheumatologist to diagnose inflammatory rheumatic and collagen diseases. REMOIR's knowledge base (KB) contains 1058 heuristic rules to implement the associative knowledge which leads to the diagnosis, and 978 basic and deduced disease findings. Rules are grouped in 33 modules, which permits a sophisticated hypothesis generation at three levels of knowledge: facts, syndromes and diseases. The inference engine is MILORD, a LISP-based program with fuzzy logic mechanics and meta-knowledge representation. The diseases embedded in the system include the following groups: idiopathic inflammatory arthropathies, crystal-associated synovitis, spondyloarthropathies, collagen diseases, vasculitis, and infectious arthritis-spondylitis. Heuristic knowledge has been included from diagnostic criteria tables, literature and personal experience of a rheumatologist.

A single-blinded validation trial involving five national rheumatology hospital-based units has been performed. A total of 81 cases belonging to the domain included in the ES (at least four for each group) were evaluated blindly by 4 rheumatology consultants, 4 rheumatology residents and 4 non-rheumatology residents. The ranked lists of diagnoses for each case given by REMOIR and by the physicians were analyzed in two ways: (a) comparing the first and two top diagnoses given by each one, and (b) by cluster analysis. We found in average a 61% concordance of the first two diagnoses given by REMOIR and the physicians with few differences among them, which suggests that the cases evaluated were quite well defined. In a cluster analysis which used distances corrected for interdependence of diagnoses using Mahalanobis' method, REMOIR situated close to the consultants group, suggesting an acceptable performance in this sense.