15th INTERNATIONAL LEPROSY CONGRESS ABSTRACTS

CHEMOTHERAPY

CH01

ACTIVITY AGAINST LEPROSY BACILLUS OF A SINGLE DOSE COMBINATION OF OFLOXACIN PLUS MINOCYCLINE, WITH OR WITHOUT RIFAMPIN, IN MICE AND IN PATIENTS

Jacques Grosset,[1]* Samba Sow,[2] Evelyne Perani,[1] Christian Lienhardt,[2] Vimala Diderot,[1] and Baohong Ji[1]
Faculté de Médecine Pitié-Salpêtrière, Paris, France,[1] and Institut Marchoux, Bamako, Mali[2]

As steps for developing a fully supervisable, monthly administered multidrug regimen for leprosy, bactericidal effect against *M.leprae* of a single dose combination ofloxacin-minocycline (OM), and rifampin-ofloxacin-minocycline (ROM) was evaluated in mouse footpads and in patients. In mouse experiments, results of proportional bactericidal method demonstrated that the activity of a single dose OM was dosage-related; larger dosage, i.e., 300 mg O plus 50 mg M per kg body weight, displayed bactericidal effect, whereas smaller dosage, i.e., 150 mg O plus 25 mg M per kg, was not bactericidal. The activity of a single dose of larger dosage OM was significantly inferior to that of a single dose R, and the addition of either dosage of OM neither enhanced nor antagonized the activity of R. In terms of bactericidal effect, the consequence of excluding clarithromycin from drug combinations is only marginal. In clinical trial, 20 previously untreated lepromatous patients were randomly allocated to 2 groups with 10 each, and treated, respectively, with a single dose of 600 mg R plus 400 mg O and 100 mg M (ROM), or a single dose of 400 mg O plus 100 mg M (OM). Adverse events, mainly gastrointestinal complaints, were mild and transitory, did not accompany by significant findings on physical examination, indicating that both combinations were well tolerated. Seven days after the single dose, slight clinical improvement was observed in almost all patients in both groups; the mean values of bacterial index were virtually unchanged from pretreatment values; the mean value of morphological index was significantly reduced in patients treated with ROM but not in those with OM. Bactericidal effect was monitored by titrating, through mouse footpad inoculation, the proportion of viable *M.leprae* in skin biopsies taken before and 7 days after a single dose of treatment. A single dose of ROM displayed powerful bactericidal effect that the bacilli from 9 of 10 patients lost their infectivity for normal mice inoculated with 5000 organisms per footpad; a single dose OM also exhibited definite bactericidal activity in 7 of 10 patients, although it was significantly less bactericidal than that of ROM, as only in one patient whose organisms lost their infectivity for normal mice. Because of these promising results, a test of the efficacy of multiple doses of ROM in a larger clinical trial appears justified.

CH02

WHY MULTIDRUG THERAPY FOR MULTIBACILLARY LEPROSY CAN BE SHORTENED TO 12 MONTHS

Baohong Ji and Jacques Grosset
Faculté de Médecine Pitié-Salpêtrière, Paris, France

The 24-month MDT for MB leprosy is still too long and becomes an obstacle in implementing MDT. It would facilitate implementation if duration could be shortened without significantly compromising efficacy. Following information may be useful to define the appropriate duration. First of all, due to a series modifications, definition of MB has become much broader, resulting in classifying many cases that would otherwise be PB leprosy as MB, and, unlike in early 1980s when all newly detected MB cases were skin smear positive, the proportion of positive cases in 1996 was less than half. Because bacterial loads of majority of MB cases currently classified are significantly smaller than in the past, overall requirements of chemotherapy for MB may also be less. Secondly, relapse rate after MDT is very low, about 0.2% annually among MB cases, indicating that there is enough room for further shortening the duration to less than 24 months. Despite the possibility that relapse rate could be significantly higher among MB cases with high initial BI, such cases become relatively few in the fields, hence, total number of relapses caused by them in a control program will be small. Thirdly, major role of dapsone (DDS) - clofazimine (CLO) component in MDT regimen in to ensure elimination of spontaneously occurring rifampin (RMP)-resistant mutants, estimated to be no greater than 10^4 in an untreated lepromatous case. Recent findings indicate that 3-month treatment with the component alone killed ≥99.999% of viable *M.leprae*, suggesting that all RMP-resistant mutants are likely to be eliminated by 3-6 months of treatment with DDS-CLO component in MDT. Fourthly, in a THEMYC multicentre trial, not a single relapse has been detected among groups of 500 MB cases (initial BI ≥2) treated, respectively, with 24- or 12-month MDT, and followed-up for 3-5 years after stopping treatment, suggesting that 12-month MDT is as effective as 24-month. A clinical trial in Malawi also concluded that 18-month MDT may be sufficient for MB leprosy. Finally, clinical and bacteriological progress of defaulted MB cases also suggest that treatment with less than 12 months MDT exhibited promising therapeutic effects among majority of cases. Based on these information, the WHO Expert Committee on Leprosy concluded, at its latest meeting of 1997, that it is possible that the duration of the MDT regimen for MB leprosy could be further shortened to 12 months.

CH03

TWO NEW DRUG COMBINATIONS IN THE TREATMENT OF LEPROSY

Gertrude P. Chan, E.M.Gonzaga, M.F. De los Santos, L.M. Reyes and S.G. Franzblau

Research Institute for Tropical Medicine, Dept. of Health. Muntinlupa City, Philippines

Our short-term clinical trials on clarithromycin monotherapy and fusidic acid monotherapy showed that the former to be rapidly bactericidal and the latter to have activity roughly equivalent to that of dapsone or clofazimine. Other data suggest that fusidic acid may have reaction-suppressive activity and we took the position that the future of this drug in leprosy was dependent upon the clinical demonstration of such activity. Two new multi-drug regimen were formulated consisting of (A) daily clarithromycin 500mg and minocycline 100mg plus monthly rifampicin 600mg and (B) daily clarithromycin 500mg and fusidic acid 750mg plus monthly rifampicin 600mg. Both regimens were taken for a total of six months. These regimens were evaluated against the current recommended 2-year WHO-MDT regimen (C) with regard to clinical and bacteriological improvement, leprae reaction, tolerance, adverse effects and patient acceptability and compliance. Fifty untreated multibacillary leprosy patients per regimen were recruited.

The clinical efficacy of regimens A and B as determined by rate of lesion resolution has been exceptional compared to C with a somewhat more rapid response observed with regimen A. The overall frequency of reaction among the three regimens is not significantly different. It appears however, that regimen B may be superior to regimen A and C with respect to moderate to severe reversal reaction. All the regimens were tolerated. The acceptability and compliance is better among patients on regimen A and B. Significant number of patient with pre-treatment bacillary index of 3+ and above reactivated with clinical and bacillary index deterioration several months after completion of treatment with regimen A and B. With this findings, it can be suggested that regimen A and B is effective and safe but treatment should be extended to a minimum of 12 months among multibacillary patients.

CH04

ROM SINGLE DOSE FOR PB LEPROSY WITH 1 TO 3 LESIONS.

VV Pai, CR Revankar, RR Pai, Mary Das and R Ganapati

specificity (98,5% and 97,0%) and effectivity (98,6 and 97,2%) of both tests at 100% sensitivity. The results obtained appear to be rather interesting and promising for further development of diagnostic and vaccine preparations based on M.lufu.

MI14

Gene Vaccination for *M. leprae* hsp65 using plasmid DNA carrying Immunostimulatory Sequences.

Hiroko Nomaguchi [1], Tin Maung Aye [2], Yasuko Yogi [2], Haruki Okamura [3], Masanao Miyata [2] and Yukio Sato [2].

1)Leprosy Res. Center, NIID, Tokyo Japan. 2)Hyogo Medical College, Hyogo Japan. 3) Fukushima Medical College, Fukushima Japan.

Recently it has been popular using DNA vaccines. The method is more easier to manufacture, provide prolonged antigen expression and when co-delivered with costimulatory molecles, enhance the subsequent response to the DNA-encoded antigen compared with conventional protein vaccines.

We constructed the recombinant DNA for expression of *M. leprae* hsp65 using pACB which carry two immunostimulatory DNA sequences located within ampicillin resistance gene. The BALB/cA mice vaccinated with the recombinant DNA were sacrificed for analysis of immune responses against *M. leprae* by splenocytes and macrophages cultivation. IFN-γ was produced from splenocytes culture of the vaccinated mice, and enhanced by co-cultivation with *M. leprae* lysate or hsp65 *in vitro*.

This result suggest that hsp65 is useful protein antigen against defense for *M. leprae* infection, and this method is a good technique for development of vaccines.

MI15

DEVISING A MORE PERFECT LEPROSY VACCINE

A. N. Chakrabarty and # Sujata G. Dastidar

Calcutta University College of Medicine and # Jadavpur University, Calcutta,India

The basic problems of immunity in LL and non-TT cases of leprosy are highlighted by defects in the cell mediated immunity, a progressive hyperbacillimea, a harmful persistent immune-complex state which actually protects the lepra bacilli, rather than killing them, a macrophage granuloma reflecting a surrender to the leprosy bacillus, and massive bacillary invasion of almost all tissues and organs. In theory and practice, experimental evidences show that immunological unresponsiveness of LL cases to leprosy bacillary antigens can be partly or wholly changed to a positive response by various permutations and combinations of BCG, other mycobacteria and leprosy bacillus, modulated by immunoboosters. Such responses may also be long lasting. The immunological failure reflected by lepromin anergy, immune complex and macrophage granuloma formation, may be corrected substantially, firstly by reducing the bacterial load using chemotherapy and subsequently various combinations of immunotherapy ; this will help achieving lepromin positivity and conversion of the cases by recruiting appropriate subsets of the T-cells. An in vitro grown killed culture of the leprosy bacillus will be the most suitable ingredient of all combination vaccines. Our studies show that these in vitro cultures (CAN bacteria) have same immunological specificity as the leprosy bacillus. Selective chemotherapy is a suitable adjunct based on in vitro sensitivity tests. As of today, all studies indicate that the CAN bacteria are in vitro cultivated forms of leprosy.

MI16

IN VITRO DETERMINATION OF ANTIMICROBIAL SUSCEPTIBILITY OF *MYCOBACTERIUM LEPRAE* BY THE MICROPLATE ALAMAR BLUE ASSAY

Scott G. Franzblau

Laboratory Research Branch, Gillis W. Long Hansen's Disease Center, P.O. Box 25072, Baton Rouge, LA 70894

The Alamar Blue reagent, an oxidation-reduction indicator, was used to assess antimicrobial activity of drugs against the non-cultivable *M. leprae* in axenic medium in 96-well plates. 10^7 *M. leprae*/well were exposed to antimicrobial agents for 1-2 weeks at 33C under ambient or microaerophilic conditions. Alamar Blue reagent was added and the reduced form of the dye was measured fluorometrically after 48 hours incubation and compared to that of drug-free cultures. Marked dose responses were observed to rifampin and clarithromycin, both effecting a significant reduction in fluorescence at 39 ng/ml. Dapsone was also active at this concentration while sparfloxacin, minocycline and ofloxacin showed significant inhibition at 62.5, 125 and 500 ng/ml respectively. Alamar Blue is an inexpensive, non-toxic dye which can be used to rapidly determine the viability and drug susceptibility of *M. leprae*.

MI17

A NEW RAPID METHOD TO MEASURE RIFAMPICIN RESISTANCE IN *MYCOBACTERIUM LEPRAE*

Stewart Cole, Nadine Honore, Andrea Thomas* and Paul Roche*
Unite de Genetique Moleculaire Bacterienne, Institut Pasteur, Paris, FRANCE and * Mycobacterial Research Laboratory, Anandaban Leprosy Hospital, Kathmandu, NEPAL

Rifampicin is the key bactericidal drug in multi-drug therapy (MDT) for leprosy. Resistance to rifampicin is rare in leprosy and measurement of rifampicin resistance is dependent on the mouse foot pad assay which is rarely applicable to the detection of resistance in patients relapsing after MDT. The mutations of the *rpoB* gene associated with rifampicin resistance in *Mycobacterium leprae* have been identified and employed in a novel line probe assay. PCR amplification of the *rpoB* gene from skin biopsies from reactivated/ relapsing leprosy patients was followed by hybridisation to oligonucleotides complementary with the wild-type gene and with 5 of the point mutations which account for 70% of the recognised mutation in rifampicin resistant leprosy. Binding to oligonucleotides was visualised by binding streptavidin-alkaline-phosphatase to the biotin labelled PCR product and incubating with chromagen.
The application of this test to the detection of rifampicin resistance and preliminary results from relapse patients in India and Nepal will be presented.

MI18

THE DIHYDROPTEROATE SYNTHASE OF *MYCOBACTERIUM LEPRAE* AND DAPSONE RESISTANCE

Diana L. Williams and Thomas P. Gillis

Molecular Biology Research Department, Laboratory Research Branch, GWL Hansen's Disease Center, School of Veterinary Medicine, Louisiana State University, P.O. Box 25072, Baton Rouge, Louisiana 70894

Dihydropteroate synthase (DHPS), encoded by *folP*, is a key enzyme in the folic acid biosynthesis pathway of bacteria which catalyzes the condensation of para-aminobenzoic acid (PABA) and 7,8-dihydro-6-hydroxymethylpterin-

pyrophosphate to form dihydropteroate. Sulfonamides are a class of drugs that act as substrate analogues competing with PABA and thereby, exerting their antimicrobial effect. Dapsone (DDS), a sulfonamide analogue, is an effective antileprosy drug; however, resistance to this drug is quite high in some regions of the world with the potential for undermining current control strategies for leprosy. The mechanism of DDS resistance in *Mycobacterium leprae* is unknown, however, it is thought to be associated with DHPS. We have previously cloned the putative *folP* from a DDS-susceptible strain of *M. leprae* into a DHPS temperature sensitive mutant of *E. coli* (MC4100ts3) and showed that expression of this gene product complemented the folate pathway at 42°C. Three possible mechanisms of DDS resistance directly associated with DHPS in *M. leprae* were investigated: 1) missense mutations in *folP* leading to an altered DHPS, 2) *folP* gene amplification leading to overexpression of DHPS and 3) mutations in promoter-like regions upstream of *folP* which may up regulate DHPS. Comparison of *folP* sequences from DDS-resistant and DDS-sensitive *M. leprae* strains showed no differences. Restriction fragment length polymorphism analysis using a *folP* probe and *Stu*I digests of chromosomal DNA from DDS-resistant and DDS-susceptible strains of *M. leprae* showed that one copy of the *folP* gene was present in all strains, indicating that gene amplification was not a mechanism for DDS resistance in *M. leprae*. Comparison of promoter-like regions upstream of *folP* from DDS-sensitive and resistant strains showed no sequence differences. Therefore, these data suggest that resistance of *M. leprae* to DDS is not directly associated with overexpression of *folP* based on gene amplification, altered promoter activity or an altered structural *folP* gene in the DDS-resistant strains analyzed in this study.

MI19

RIFAMPICIN RESISTANT *MYCOBACTERIUM LEPRAE* ISOLATED FROM JAPANESE PATIENTS AND MUTATION IN *rpoB* GENE

Masanori Matsuoka,* Yoshiko Kashiwabara,* Masaichi Gidoh,* Masanori Kai,* Shinji Maeda, * Noboru Nakata,* Eiji Nagao** and Kunihiro Kinjoh**

* Leprosy Research Center, Tokyo, Japan.
** National Leprosarium Okinawa Airaku-en, Okinawa, Japan

Many rifampicin resistant *M.leprae* have been detected and threaten the effective leprosy control. Genetic method might be useful for the early detection of resistant bacilli, since the mutation in the *rpoB* gene confers the rifampicin resistance. Two rifampicin resistant *M.leprae* were isolated from Japanese patients and nucleotide sequence of *rpoB* gene was deduced to clarify the causative mutation in the gene. Usefulness of the simple method for the detection of mutation was also apprised.

The nude mice were inoculated with 8.0×10^5 or 1.0×10^4 bacilli into the foot fad and fed on diets containing with rifampicin in the concentration of 0.01gm per 100gm of diet from 2months after infection. Bacillary growth in the rifampicin treated mice was compared to that in the untreated mice by 55 weeks after infection. The susceptibility to drugs was examined by mouse foot pad method or Buddemeyer system. One isolate was resistant to rifampicin, KRM 1648 and DDS. The mutation in the codon for serine-531 which resulted in the substitution to leucine was detected as in most resistant cases so far reported. Markedly different banding pattern in PCR-SSCP was depicted between wild type and the resistant isolate. Heteroduplex analysis revealed the two bands in the heterogeneous mixture of 305bp PCR products and single band in the homogeneous one. Another isolate was considered to be low resistant to rifampicin, however confirmation is in progress. The codon for glycine at 524 was changed from GGC to GGT, but no change in amino acid, silent mutation, was shown. Other point mutations were revealed in other regions of the gene. It is concluded that some genetic methods are applicable for detecting mutation in the gene, which confers rifampicin resistant, but susceptibility for the rifampicin must be confirmed by other methods such as sequencing.

MI20

HOW *M.LEPRAE* DEFEATS A DEFENSE MECHANISM OF THE HOST

K. Prabhakaran, E.B. Harris & B. Randhawa. GWLHD Center @ LSU, Baton Rouge, LA 70894-5072, USA

Mycobacterium leprae possesses a highly active enzyme that rapidly hydrolyses lysophospholipids. Lysophospholipids generated by host tissues are extremely reactive molecules that can lyse cell membranes and kill pathogenic organisms. The cell membranes of both prokaryotes and eukaryotes are mainly made up of phospholipid bilayers. Phospholipases that degrade phospholipids are classified according to the site at which each enzyme acts on the substrate molecule. Phospholipase A_2 (PLA_2) comprises a diverse family of enzymes that cleave the *sn*-2 fatty acylester bond of glycophospholipids to yield a fatty acid and a lysophospholipid. PLA_2 has a central role in generating arachidonic acid that leads to the formation of thromboxanes and prostaglandins. We detected lysophospholipase in *M.leprae* by a sensitive radioisotopic method. Optimum activity was at 37°C and at pH 6.0. Temperatures above 70°C completely inactivated the enzyme. The compound AACOCF3, a trifluromethylketone analog of arachidonic acid, inhibited the activity. The inhibition appeared to be of the uncompetetive type. The K_m of the enzyme was $2.5\text{x}10^{-4}$M, suggesting a fairly strong affinity for the substrate. Lysophospholipids have been shown to be microbicidal to invading organisms. Possession of lysophospholipase by *M.leprae* apparently is one of the mechanisms which enables the bacilli to survive and proliferate in the phagocytic cells of the host.

MI21

STRUCTURAL ANALYSIS OF THE HIGH MOLECULAR MASS PENICILLIN-BINDING PROTEIN 1 OF MYCOBACTERIUM LEPRAE

Sebabrata Mahapatra, Saumita Das and Joyoti Basu

Department of Chemistry, Bose Institute, Calcutta-700009, India

Two high molecular mass multimodular penicillin-binding proteins (PBPs) of class A have been previously identified from the collection of ordered clones of Mycobacterium leprae, produced and characterized in Escherichia coli. PBP1 behaves as a PBP of low penicillin affinity. Deletion of the N-terminal amino acids suggested that a region between residues 39 and 81 probably functions as a membrane association site. Deletion of the C-terminal 164 amino acids did not affect membrane association. Deletion of the non-penicillin -binding (n-PB) module led to production of a truncated PBP localized in inclusion bodies. The PBP was solubilized with guanidine-HCl and refolded in a renaturation buffer. Refolding was confirmed by measuring intrinsic fluorescence of unfolded and refolded forms. The truncated PBP showed kinetic properties similar to the intact PBP. This is the first report of a class A PBP retaining penicillin-binding activity after removal of the n-PB module. This PBP appears to be a low-affinity penicillin target unique to mycobacteria; since a protein with amino acid sequence similarity has recently been identified in a cosmid of M. tuberculosis. The fact that it retains activity as a soluble protein carrying the PB module only, should facilitate future X-ray crystallographic studies on this target.

MI22

SOME BIOCHEMICAL FEATURES OF THE INTERACTION OF *MYCOBACTERIUM LEPRAE* WITH LAMININ. Marques MAM, Brennan PJ* and Pessolani MCV. Laboratório de Hanseníase, Fundação Oswaldo Cruz, Rio de Janeiro, Brazil. 21045. *Department of Microbiology, Colorado State University, Fort Collins, CO. USA. 80523

The neural tropism of *M. leprae* has been recently attributed to the specific binding of the leprosy bacillus to laminin 2 (LN2), a LN isoform preferentially distributed on the Schwann cell basement membrane (Rambukkana et al., Cell 88: 811-821,1997). However, the molecule on *M. leprae* surface responsible for laminin binding is still unknown. In order to characterize the laminin receptor of the leprosy bacillus, we investigated several biochemical features of *M. leprae*-laminin interaction. By using microtiter wells coated with the bacilli, we confirmed the capacity of soluble LN2 to bind to *M. leprae*. Enhanced binding capacity of laminin was

observed with purified cell wall of the bacilli, indicating a surface location for this receptor. Also, binding of LN2 to *M. leprae* was reduced by treatment of the bacterial cells with proteinase K or trypsin, suggesting that the binding to this basement membrane protein is mediated by bacterial surface proteins. Since phenolic glycolipid I (PGL-I) is abundantly present on the surface of *M. leprae*, we also investigated a possible role of this molecule on the interaction of LN2 with the bacteria. Preincubation of LN2 with PGL-I resulted in significant enhancement of LN2 binding to the bacteria. These preliminary results suggest that LN2 binds to proteins located on the surface of *M. leprae* and that PGL-I enhances the binding of LN2 to these proteins. Three independent approaches are currently being undertaken in order to isolate the laminin receptor(s) from bacterial extracts: i) far western (gel-overlay), ii) laminin affinity chromatography, and iii) immunoprecipitation of laminin-receptor complexes.

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MI23

STRUCTURAL CHARACTERIZATION OF THE CELL WALL OF *Mycobacterium leprae*.

Delphi Chatterjee, Kelly J. Motichka and Patrick J. Brennan.

Department of Microbiology, Colorado State University, Fort Collins, Colorado 80523, USA.

Mycobacterial cell wall polysaccharides include cell wall arabinogalactan (AG) and peptidoglycan (PG). AG is esterified at the distal ends with mycolates and covalently linked to a peptidoglycan layer at the reducing terminus. In our effort to address the structures of these molecules in *M. leprae*, walls of *M. leprae* were purified on a discontinuous sucrose density gradient. Purified cell wall cores were subsequently treated with mild base to remove bound mycolates and mild acid to release PG from the covalently linked AG. The mild acid-solubilized AG was fractionated using size exclusion column chromatography and analyzed using chemical derivatization and mass spectrometry.

We have also undertaken the formidable task of digestion of peptidoglycan (PG) of *M. leprae* , since mycobacterial PG are known to be notoriously resistant to lysozyme. The acid-released peptidoglycan is reduced and subjected to degradation using several methods (acid hydrolysis, mutanolysin digestion, trifluoromethane sulphonic acid treatment). We hope to assign the primary structure of *M. leprae* PG using an integrated approach of LC/ESMS (electrospray mass spectrometry). A comparative study is also carried out using *M. tuberculosis* cell wall in order to address subtle differences/modifications between the cell wall components of these two mycobacterial species.

We are also studying the non-covalent bound cell envelope polysaccharides of *M. leprae*, such as the secreted arabinomannans, glucans and lipoarabinomannans, by examining polysaccharides isolated from infected and non-infected armadillo livers.

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MI24

COMPARISON OF ASSESSMENT OF VIABILITY BY NORMAL MOUSE FOOT PAD, ATP MEASUREMENT AND PCR ASSAYS.

U.D.Gupta, K.Katoch, H.B.Singh, M.Natrajan, V.D.Sharma, V.M.Katoch

Central JALMA Inst. of leprosy (ICMR), Taj Ganj, Agra-282 001 (UP), India

Various techniques for the estimation of M.leprae viability have been described. Mouse foot pad (MFP) is one of the old and main techniques for this purpose. Besides MFP, bacilllary ATP measurements and PCR assay have been used in this study to determine the viability. In this investigation, an effort has been made to compare the usefulness of these techniques to assess the therapeutic effect of a newer drug regimen comprising of conventional drugs as well as newer drugs like ofloxacin & minocycline in smear positive MB cases in the beginning and after completion of one year of treatment. Biopsies were processed for viability assessment by normal mouse foot pad (Shepard et al), bacillary ATP measurement (Katoch et al) and PCR assay (Williams et al) by the techniques established at this Institute. Comparison of results by these techniques in untreated as well as treated patients suggests overall good usefulness of MFP & ATP measurement in assessing the effect of the MDT including this regimen. ATP assay has been found to be more sensitive in cases with low bacillary load. PCR assay appears to be suitable only for knowing the trends.

MI25

IDENTITY OF THE LEPROSY BACILLUS WITH CAN BACTERIA

Sujata G. Dastidar, Aninda Sen *, Aparna Chakrabarti* and A.N. Chakrabarty *.

Jadavpur University and # Calcutta University College of Medicine, Calcutta, India.

The CAN bacteria or chemoautotrophic nocardioform bacteria (CANb) had been reproducibly cultivated and propagated continuously from human, mouse footpad and armadillo leprosy tissues ; these had been repeatedly isolated. The CANb, like the leprosy bacillus (LB) are non-cultivable on any of the known/acceptable media, but grow only on chemically defined media containing $(NH_4)^{+2}$, liquid paraffin, urea etc. These have an identical mycolate profile, long generation time (Ca. 44 hr), nocardioform, weak acidfastness, identical mouse footpad pathogenicity, lepromin response(s) across the LL-TT spectrum and presence of PGL-I. Its possession of collagenase and gelatinase further identifies it with the LB. Its guanine auxotrophy possibly explains it s selective preference of the macrophage nucleus for scavenging it. Multiple molecular biological parameters applied on the CANb viz-a-viz the LB show these as two converging on identical points.

MI26

GRAM-POSITIVE COCCOID MICROORGANISMS CULTIVATED FROM THE HANSEN'S DISEASE PATIENT SPECIMENS, AND M. LEPRAE.

Tsunehiko Hirata

JST Sr. Researcher, Phrapradaeng Hospital, Thailand

Since Hansen, G.A., after observing the Hansen's disease (HD=Leprosy) bacillus in the lesions, made the first unsuccessful attempts to cultivate it outside the host, as reported by Terni (1950) in a long time back, a great number of research workers have claimed that they have succeeded while others even now are doubtful that it has been accomplished.

It is said that the microorganisms most commonly isolated and known as the results of pioneer research works of leprosy bacilli are included in following categories: (a) strains belonging to diphtheroid bacilli which were either non-acid-fast or only weakly acid-fast, (b) chromogenic acid-fast bacilli, (c) non-chromogenic acid-fast bacilli and (d) anaerobic bacilli or actinomyces.

Amongst such microorganisms, the Gram-positive coccoid organisms are of compelling interest as observed and examined by Delville (1973) and Chatterjee (1976). The organisms are easy to be stained with Gram's method and to be cultured on media. From the bacteriological observations of their properties, they may be seen at a glance as the so-called contaminants or various bacilli, though they show a cyto-morphological change in state from cocci to rod — from rod to cocci.

The present report is a result scrutinized the bacteriological observations of the Gram-positive coccoid microorganisms cultivated from the HD patient specimens and the bacteriological mutual relation to HD bacilli varied from Gram-positive to Gram-ghost or Gram-neutral and examined as the acid-fast bacilli stain red.

MI27

IN VITRO CULTIVATION of *Mycobacterium leprae* with INTERLEUKIN-2

Choong-San Oh, M.D., Ph.D.
Modern Science Clinic for Biomedical Research
Rm. 303, SPE Bldg, 302-46 Dongbuichon-Dong, Yongsan-Gu
Seoul, 140-031, Korea

I reported that colony forming acid-fast organisms are isolated from armadillo spleen and nude mouse footpad infected with *M. leprae* and that these two organisms maintain their multiplication in 3% Ogawa media containing recombinant human interleukin-2 (IL-2).

Continued cultivation trial showed that these two organisms maintain their IL-2 dependency up to 15th and 16th generation, in case of armadillo and nude mouse originated *M. leprae*, respectively.

Next step of experiment was to identify these organisms with polymerase chain reaction (PCR) using *M. leprae* specific primers C & D and primers L1-L4 (nested PCR). These showed that the template of armadillo *M. leprae* DNA prepared at Colorado State University, USA, the template of nude mouse *M. leprae* prepared at National Institute for Leprosy Research, Japan, the 11th generation isolated from nude mouse at my laboratory, and the 10th generation isolated at my laboratory from armadillo spleen infected with *M. leprae*, all these 4 templates amplified the expected and the identical sizes of DNA fragments (372bp in case of primers C & D; 347bp with primers L1-L4).

Quantitative PCR showed that 10^9 fold multiplication of the 11th generation (isolated at my lab from a nude mouse footpad infected with *M. leprae*) for 2 months after the inoculation. The control culture tube without IL-2 showed 10^2 fold for the same time period.

Also, the *M. leprae* template prepared with the 10th generation culture isolate from armadillo spleen amplified a 390bp DNA fragment in a PCR using γ3 & γ10 primers specific for human IL-2 receptor γ chain gene. This PCR product was sequenced successfully and further studies such as cloning and the DNA hybridization are under investigation to identify the full IL-2 receptor gene sequence in *M. leprae*.

In conclusion, *M. leprae* is successfully cultivated in Ogawa media with IL-2.

MI28

CULTIVATION OF MYCOBACTERIUM LEPRAE IN ARTIFICIAL CULTURE MEDIUM

S. K. Biswas

Department of Pathology
Medical College
Calcutta - 700 073, INDIA

A novel procedure in the cultivation of M.leprae in combined Dubos-Lowenstein-Jensen medium after addition of thyroxine sodium is being reported. This has been found to be successful as the organisms, after multiplying vigorously in thyroxine containing Dubos medium, have produced a visible colony on the surface of L.J. slant during 8-16 weeks of incubation at 37°C. The enhanced growth of this recalcitrant organism is due to stimulating effect of thyroxine as well as supply of readymade basic nutrients in the Dubos medium. Intradermal inoculation of bacterial suspension from the subculture into the foot-pad of cortisone treated swiss mouse revealed an early appearance of specific histological lesion of leprosy with infiltration of nerve fibres by lepra cells. The methodology, described here for in-vitro cultivation of M.leprae, may open out a new era in preparation of purified vaccine, production of specific monoclonal antibody and study of in-vitro drug sensitivity, and as such ensure rapid eradication of leprosy.

MI29

INHIBITION OF METABOLISM AND GROWTH OF *MYCOBACTERIUM LEPRAE* BY GAMMA-IRRADIATION

L.B. Adams,[1] N.A. Soileau,[1] R. Fajardo,[1] J.R. Battista,[2] and J.L. Krahenbuhl[1]

GW Long Hansen's Disease Center, Baton Rouge, LA, USA[1] and Louisiana State University, Baton Rouge, LA, USA[2]

Mycobacterium leprae is an extremely slow growing organism, having an in vivo doubling time of ~12.5 days. In vitro, it is uncultivable on artificial medium, but viability can be maintained, without multiplication, for a limited time. Traditionally, incubation at 100°C or autoclaving has been used to kill *M. leprae* for experimental use. Both of these methods cause extensive denaturation and damage to the bacilli. In this study, we evaluated gamma-irradiation (γ-rad) as a means to kill this slowly growing organism. Freshly harvested, viable athymic *nu/nu* mouse-derived *M. leprae* were exposed to varying doses (10^2 to 10^5 Rad) of γ-rad in a Sheppard Model 484 ^{60}Co irradiator. The cultivable, environmental mycobacterium, *M. lufu*, was used as a control. To assay metabolic activity, both species were inoculated into the BACTEC 460 system which measures the oxidation of ^{14}C-palmitic acid to $^{14}CO_2$. Growth of *M. leprae* was evaluated using the proportional bactericidal mouse foot pad assay. Growth of *M. lufu* was evaluated by plating serial dilutions on 7H11 agar plates for enumeration of colony forming units (CFU). γ-rad of both *M. leprae* and *M. lufu* resulted in a dose-dependent inhibition of metabolic activity. γ-rad of up to 10^3 Rad had no effect on the oxidation of palmitic acid by either organism. With *M. leprae*, 10^4-10^5 Rad caused an intermediate inhibitory effect, whereas 10^6 Rad yielded almost total inhibition of metabolic activity. With *M. lufu*, in contrast, 10^5 Rad inhibited metabolic activity by 99%. However, culture of γ-rad *M. lufu* showed that while 10^5 Rad caused ≥2 log reduction in the number of CFU, ~ 10^4 CFU/ml survived. γ-rad of 10^6 Rad sterilized the culture of *M. lufu* as no CFU were recovered. The effect of γ-rad on growth of *M. leprae* is currently being evaluated. These data suggest that γ-rad may be an efficient way to kill *M. leprae* without causing extensive damage to the cell architecture, as opposed to boiling or autoclaving. Killing *M. leprae* by γ-rad may be preferable when comparing cellular responses to live versus dead bacilli in vitro and in vivo.

MI30

GENE FUSION EXPRESSION OF AN IMMUNOMODULATOR FROM *MYCOBACTERIUM LEPRAE*

S Suresh Babu and P R Mahadevan
Malladi Research Centre, Ekkattuthangal, Chennai-600 097. India

Gene fusion expression technology has come a long way from the days of insoluble lacZ fusion constructs that were useful only as antigens. Today's fusion systems not only provide high levels of gene expression, but also often produce soluble and correctly folded fusion proteins that can be conveniently purified and efficiently cleaved. Since mycobacterial transcription and translation signals are poorly functional in *E. coli*, it is necessary to put the required gene under a strong and inducible promoter system to achieve the production of desired amount of the product. If that expression system has a fusion partner, then, it provides high stability and solubility for the fusion protein with an opportunity to fold correctly instead of precipitating into inclusion bodies.

Delipidified Cell Component (DCC) of *M.leprae* has been shown to have immunomodulatory effect both *in vitro* and *in vivo*. By screening the λgt11 expression library of *M.leprae* with antibodies raised against DCC, various clones were selected. Out of these, one clone of 1.6 Kb length, expressing a protein of 25 kD showed functional properties similar to DCC.

This gene was cloned into the *E.coli* gene fusion expression system with a fusion to Maltose Binding Protein (MBP) which is 42 kD. The fusion protein expressed was 67 kD indicating that the gene was coding for 25 kD protein. The expression level was high (~15-20% of the total soluble protein) and the purification was achieved by the affinity chromotography using Amylose resin. Factor Xa protease was used for cleaving at the junction of the fusion and the MBP was removed by repeating the Amylose resin affinity chromotography. The biotin-labelled Factor Xa was also removed from the sample by the immobilized streptavidin.

This purified product, which was part of the 65 kD hsp, was found to have similar immunomodulatory effect as DCC. By the use of internal restriction sites, this gene was further spliced into three distinct pieces, and cloned and expressed in the similar way as explained above. The MBP fusion system helped to make these peptides in large amount and by subsequent experiments the immunomodulatory effect of them was proved. Part of the work was done at the Foundation for Medical Research, Mumbai, India.

MI31

MYCOLATES OF DIFFERENT LEPROSY-RELATED MYCOBACTERIA : A COMPARATIVE STUDY

Aparna Chakrabarti, K.Ghosh#, A.Sen, S.G.Dastidar# and A.N.Chakrabarty

Calcutta University College of Medicine and #Jadavpur University, Calcutta, India

Mycolate profile is used for identification of Mycobacterium spp. In this study, the pattern of mycolic acids have been studied in chemoautotrophic nocardioform bacteria (CAN b) derived from infected tissues of rat, human leprosy and tissues of epizootic ulcerative syndrome (EUS) - infected fish which also yielded a leprosy bacillus like pathogen. Closeness of the mycolate profiles of these 3 mycobacteria with that of different mycobacteria have been studied to distinguish these from each other, if possible, as well as other mycobacteria.

In this study, mycolates have been isolated from all the test bacterial samples by alkaline hydrolysis followed subsequently by thin layer chromatography. Spots were visualised by iodine vapour method.

CAN b, derived from human lepromatous tissues, showed the same profile as that of M.leprae and M. gordonae, containing three types of mycolic acids, namely, α , α' & β . Subsequently, CAN b derived from rat leprosy tissues and from tissues of EUS-affected fish showed α , α' & ω bands for mycolic acids, suggesting possible close proximities of these last 2 with that of M.avium rather than with M.leprae. The taxonomic value is evaluated.

MI32

BETA-LACTAM TARGETS IN *Mycobacterium leprae*

Parul Chakrabarti, Bose Institute, Calcutta 700009, India.

Multimodular high molecular mass penicillin-binding proteins (PBPs), involved in bacterial peptidoglycan biosynthesis, are lethal targets of beta-lactam antibiotics. Peptidoglycan is one of the main structural component of mycobacterial cell wall. Identification of the genes of two high molecular mass PBPs in an ordered cosmid library of *Mycobacterium leprae*, overexpression of these genes in *Escherichia coli* and characterization of the expressed proteins reveal that these genes encode two PBPs, PBP1 (M, 81 kDa) and PBP1* (M, 69 kDa). PBP1* is a high affinity PBP and is unstable at temperatures above 25°C (Lepage *et al.*, 1997, *J. Bacteriol.* 179, 4627-4630). PBP1 is thermostable and binds penicillins with low affinity (Basu *et al.*, 1996, *J. Bacteriol.* 178, 1707-1711). This is reminiscent of the situation in *E. coli* PBP, PBP1a and PBP1b. Both *M. leprae* PBP1 and PBP1* bear the nine motifs characteristic signature sequence of multimodular bacterial class A PBPs at the same order and with the same spacing but their enzymatic and biochemical properties are markedly different. Critical analysis reveal that *M. leprae* PBP1 contains an altered sequence in one of the domains of the penicillin-binding (PB) module. Similar altered sequence is also present in a low affinity PBP, PBP C of *E. coli*. This domain may be critical for penicillin sensitivity and the altered sequence may be related to the differences in the penicillin sensitivity and thermal stability of *M. leprae* PBP1 and *M. leprae* PBP1*. The mycobacterial PBPs are the counterparts of the multimolecular class A PBPs, key components of morphogenetic networks. These studies are the first steps towards understanding the penicillin targets in mycobacteria at the molecular level. This knowledge is essential for future predictive studies on the interaction of new generation beta-lactams with the beta-lactam targets, and for the rational use of beta-lactams in antimycobacterial chemotherapy.

MI33

IN VITRO GROWTH OF *MYCOBACTERIUM LEPRAE* IN STIRRED CELLS.

Arvind M. Dhople, Department of Biological Sciences, Florida Institute of Technology, Melbourne, Florida 32901, U.S.A.

We have presented earlier evidence on limited in vitro multiplication of *M. leprae* in DH medium. The growth has been extremely slow (about 20-30 fold increase in cell mass in 16-20 weeks), and terminated after 20-24 weeks. The growth was partly attributed to the presence of a growth factor that was demonstrated to be present in tissues of armadillos infected with *M. leprae*. The reason for the termination of growth was the accumulation of hydrogen peroxide in the growth medium during incubation. Addition of catalase in the DH medium did not alleviate the situation. Addition of ketonic acid, such as pyruvic acid, to neutralize hydrogen peroxide was also not helpful unless fresh pyruvic acid was supplemented every week. This resulted in extending the growth till 24 weeks with average growth of 55-65 fold. Still the growth was terminated after 24 weeks and subcultures were not possible.

Finally, the cultures were grown in Stirred Cells using 0.2µ membrane so that the fresh DH medium will be continuously supplemented at the same rate as the spent medium is removed from the chamber. This resulted in approximately 70 fold increase in cell yield in 24 weeks. The growth was enhanced further to approximately 100 fold by incorporating both catalase and pyruvic acid in the DH medium. Subcultures from these primary cultures in Stirred Cells could be achieved only when the growth factor was added to the DH medium along with catalase and pyruvic acid. However, the growth of subcultures in Stirred Cells could not be maintained beyond 10-12 weeks with maximum yield of 10-15 fold. Nevertheless, this is the first time we were successful in achieving subcultures of *M. leprae*. The studies are being continued further.

(Supported through the funding from German Leprosy Relief Association).

MI34

PRESENCE OF CALMODULIN-LIKE PROTEIN IN *M. LEPRAE* AND ITS IMPLICATIONS ON THE DEVELOPMENT OF NEW ANTILEPROSY DRUGS

Arvind M. Dhople, Department of Biological Sciences, Florida Institute of Technology, Melbourne, Florida 32901, U.S.A.

Calmodulin-like protein has been established as the primary receptor for calcium in eukaryotic as well as in prokaryotic cells. Calmodulin-calcium complex regulates a variety of enzymes including nucleotide phosphodiesterase. Recently, we have been able to show the presence of this protein in *M. leprae* harvested from armadillos infected earlier with human-derived *M. leprae*. Thus, studies were undertaken to evaluate the effects of calmodulin antagonists on the in vitro growth of *M. leprae* using the previously established DH medium.

Among the six phenothiazine-type calmodulin antagonists tested, trifluoperazine appeared to be the most potent in inhibiting the in vitro growth of *M. leprae*, with MIC of 10 µg/ml. Chlorpromazine, trifluopromazine and thioridazine were less active than trifluoperazine, with MIC of 20 µg/ml, while the other two, acetopromazine and fluphenazine were totally ineffective even at 80 µg/ml. These findings suggest that a methylpiperazinylpropyl group attached to the nitrogen at position 10 and trifluoromethyl group at second carbon confer the antileprosy activity to the phenothiazine molecule. Results from our preliminary studies based on the incorporation of ^{14}C-acetate, ^{3}H-thymidine and ^{14}C-glycine indicate that the effect of trifluoperazine is on the synthesis of lipids, DNA and protein of *M. leprae*.

(Supported through the funding from German Leprosy Relief Association).

MI35

MODELING ACTIVITY OF SINGLE DOSE COMBINATION REGIMENS BY SIMULATING HUMAN PHARMACOKINETICS IN MACROPHAGE CULTURES OF *MYCOBACTERIUM LEPRAE*

Scott G. Franzblau, Linda Adams, Kenneth E. White and James L. Krahenbuhl

Laboratory Research Branch, GWL Hansen's Disease Center, Baton Rouge, LA

Since, with the exception of rifampin, the pharmacokinetics of the potent anti-leprosy drugs are markedly different in mice and humans, it is impossible to accurately simulate the drug concentration/time exposure in the latter by using a mouse model. Attempting to match the human AUC in most cases necessitates using a dose which results in a much higher maximum serum concentration (Cmax) than is possible in humans. The mouse model becomes even less representative when single doses of drug combinations are being assessed. The human pharmacokinetics of various combination regimens can be simulated by using *M. leprae*-infected mouse peritoneal macrophages. Cultures, in 24-well plates, are initially exposed to the expected drug concentrations following the customary doses of the corresponding drugs. At intervals of 4 hours or less, media

is easily removed and replaced with fresh media containing drug combinations at concentrations which would be expected based on their respective serum half-lives. This process continues for several days until drug concentrations are at levels below the expected minimum inhibitory concentrations. After an additional week in macrophage culture without drugs, the macrophages are lysed and the viability of the released *M. leprae* are evaluated by radiorespirometry. Data will be presented on the relative inhibitory activities of combinations of rifampin, minocycline, ofloxacin, sparfloxacin and clarithromycin in addition to dapsone and clofazimine.

MI36

ELONGATION OF *MYCOBACTERIUM LEPRAE* IN MACROPHAGES CULTURED IN THE PRESENCE OF INTERLEUKIN-10

Y. Fukutomi[1], G. McCormick[2], J. P. Pasqua[2], J. L. Krahenbuhl[2], S. Toratani[1], G. Matsuki[1], and M. Matsuoka[1]

Leprosy Research Center, National Institute of Infectious Diseases, Tokyo, Japan[1] and Laboratory Research Branch, GWL Hansen's Disease Center, Baton Rouge, LA, USA[2]

Mycobacterium leprae, the causative agent of leprosy, is an obligate intracellular pathogen that prefers the mononuclear phagocyte as its host cell. Numerous efforts have been devoted to the in vitro cultivation of *M.leprae* since its discovery, yet the leprosy bacillus remains uncultivable. Difficulty in assessing the viability of *M.leprae* has also impeded leprosy research. The availability of a constant supply of a large number of highly viable *M.leprae* from nude mice allowed us, to adapt radiorespirometry as a measure of the metabolic activity of *M.leprae*, affording a rapid (2 weeks), quantitative method to assess the viability of the leprosy bacillus in vitro.

In the present study mouse macrophages were infected in vitro with *M.leprae* from nude mice and were cultured. Radiorespirometry data over 2 weeks showed *M.leprae* in macrophages at 31°C to be more metabolically active than at higher temperatures, such as 37°C. Moreover addition of IL-10 to the cultures clearly sustained *M.leprae* metabolism in macrophages for 8 weeks. The apparent increase in number of *M.leprae*/macrophage was likely an artifact of loss and lysis of macrophage and re-phagocytosis of released *M.leprae*. Noteworthy, however, was the elongation of individual bacilli after 4 week-culture in macrophages maintained in media with IL-10 observed under light microscopy. Transmission electron microscopy also confirmed elongation of *M.leprae* in mouse macrophages sectioned after 4 weeks under the ideal culture conditions described above. In addition armadillo macrophages cultured in vitro also supported metabolism as well as elongation.

MI37

GLOBAL EPIZOOTIC IN FISH BY A LEPROSY LIKE ACTINOMYCETE POSING A POTENTIAL HAZARD TO HUMAN HEALTH.

Kumkum Ganguly, Sujata G. Dastidar, A.N.Chakrabarty#

Jadavpur University & # Calcutta University, Calcutta, India.

Presence of actinomycetic organisms have been reported in different varieties of fish affected with epizootic ulcerative syndrome (EUS) in India and elsewhere since 1988. The same organisms were isolated repeatedly from lesions of dermis, subcutaneous tissues, muscles and internal organs. Acid-fast bacilli, bacillary clumps, globi, mycelia, free acid fast bacilli (AFB) and 'Coccoid' bodies were present in the muscle tissues of fish, somewhat resembling human and rat leprosy bacilli. The characteristic macrophage granuloma surrounding these actinomycetic mycelia appeared to be consistent and compatible with actinomycetic pathogenicity. These isolates possessed fundamental similarities to the human isolates of chemoautotrophic nocardioform (CAN) bacteria, not cultivable in any common or conventional type of media. These could, however, grow easily on media for chemoautotrophy, composed of simpliest sources of C&N. These have been compared with the human leprosy bacilli on the basis of their morphological, staining, metabolic, and enzymological characteristics, lipid profile and PGL I specificity. All the above tests showed close parallelism between the CAN bacteria isolated from fish, rat and human leprosy infection. Thus EUS has not only posed a severe economic problem but also a potential hazard to fish handlers, fish mongers and even possibly fish eaters.

MI38

STRICT CONSERVATION OF *MYCOBACTERIUM LEPRAE* DNA SEQUENCES

T.P. Gillis[1] D.L. Williams[1], N. Robbins[1] and R. Frothingham[2]

[1]Molecular Biology Research Department, Laboratory Research Branch, GWL Hansen's Disease Center at LSU, P.O. Box 25027, Baton Rouge, LA and Infectious Diseases Section, Durham Veterans Affairs Medical Center, Durham, North Carolina

Nucleic acid sequence-based differentiation of microorganisms at the genus, species and strain level has fostered new approaches for comparative taxonomy, provided insight on mechanisms of microbial pathogenesis and exposed powerful markers for epidemiologic studies of infectious diseases. This approach has been informative for some mycobacterial species (MAC) and strains (*M. tuberculosis*). Systematic attempts to define DNA polymorphisms in *M. leprae* have met with limited success. While minor, independent polymorphisms have been identified in a few strains of *M. leprae*, a universal model based on genomic differences of *M. leprae* strains has not been demonstrated. We have applied restriction-fragment length polymorphism (RFLP) analysis, using numerous restriction enzymes and probes, as well as direct sequencing analysis of the 18kDa gene and the 16-23S rDNA internal transcribed spacer (ITS) region to evaluate similarities and differences between eleven strains of *M. leprae*. *M. leprae* strains originated from geographically distinct regions of the world (Philippines, Vietnam, US, Thailand, India) and the DNA from each strain was purified from bacilli either expanded in armadillos, nude mice or obtained directly from lesions of patients. In all instances RFLP patterns and DNA sequence comparisons between individually isolated "strains" showed exquisite homologies at all DNA sites studied, supporting earlier findings suggesting minimal divergence in *M. leprae*.

MI39

DETERMINATION OF METABOLICALLY ACTIVE STATE OF SLOW GROWING MYCOBACTERIA.

M. Ishaque. Institute Armand-Frappier, University of Quebec, Laval, P.Q; H7N 4Z3, Canada.

To determine the metabolically active state of various slow growing mycobacteria such as *Mycobacterium leprae, M. lepraemurium and BCG*, a rapid method was developed. *M. phlei* was used as a control. *M. leprae* bacilli were isolated from the nude mice foot pads while *M. lepraemurium* were recovered from C3H mice lepromata. *BCG* were grown on Sauton medium. *M. Phlei* were grown on Lowenstein-Jensen medium. Bacilli from various mycobacteria used in this study were purified by differential centrifugation and bacillary suspensions were prepared in 0.05 M phosphate buffer, pH 6.5. To determine the metabolically active state of mycobacteria two parameters namely oxygen uptake of bacillary suspensions and ATP content were used. By using this method, meaningful information concerning *M. leprae, M. lepraemurium* and *BCG* can be obtained in four hours while only one hour was required using *M. phlei*. The information gained could be very helpful for the *in vitro* cultivation trials as well as for the biochemical studies of slow growing *M. leprae* and *M. lepraemurium*. Bacillary suspensions which showed relatively higher rates of endogenous oxygen uptake and ATP concentrations were found to be in a better metabolically active state than suspensions exhibiting lower rates of oxygen

consumption and ATP content. Suspensions showing higher rates of respiration when used for *in vitro* cultivation trials showed relatively better multiplication, though limited, of *M. leprae* and the bacilli maintained their morphology very well for 16-20 weeks.

MI40

A METHOD OF STORING LEPROMAS

A.A.Juscenko

Leprosy Research Institute, Astrakhan, Russia

Foot pad technique of M.leprae inoculation of mice (Shepard, 1960) permitted to study M.leprae survival in different environments. Through many years' experiments we succeeded in confirming a survival of M.leprae under the conditions when biopsies from untreated LL patients were put into 40% saline solution of glycerin (in refrigerator or at room temperature). In past this method was used for preserving viability of different organisms including M.lepraemurium (Marchoux, 1934; Chorine, 1934). At the moment of biopsy, then in three and subsequently in every six months M.leprae (10000) from lepromas were inoculated into 10 BALB/c mice by Shepard's technique. Inoculum and "harvests" were counted according to Shepard and McRae (1968). During the initial 12 - 24 months characteristics of M.leprae multiplication in mice foot pads (lag-phase, log-phase and plato phase) did not almost change in the most of cases. After 3-4 years of storing an amount of M.leprae increased more slowly. Preliminary results of these experiments were published in 1984. Maximal period during which it was succeeded to preserve M.leprae viability in 40% glycerin at room t was 12 years (longer experiments were not carried out). The results obtained could account for some unsolved questions of epidemiology and pathogenesis of leprosy. The method proposed is successfully used for transportation of infected tissues from leprosy patients without ice from any region of Russia to Leprosy Research Institute (Astrakhan) for studying. During a special study (Vishnevetsky & Juscenko, 1991) it was also proved that lepromas kept in 60-80% solution of glycerin at room temperature for 2-4 weeks remain suitable for enzyme and histochemical investigations.

MI41

DNA AMPLIFICATION FOR DETECTION OF LEPROSY AND ASSESSMENT OF EFFICACY OF LEPROSY CHEMOTHERAPY

Kowit Kampirapap, Paul R.Klatser, S.Wiriyawipart

Phra-Pradaeng Hospital, Samutprakarn, Thailand

PCR for the detection of M.leprae was applied to fresh skin biopsies and skin slit smears from 122 untreated leprosy patients. The PCR positivity rates in biopsies were 95.6% in MB cases and 44.2% in PB cases. Following 1 month of treatment MB cases declined by 54.3% and PB cases by 61.8% of initial values. Six month values also declined from initial positivity rates to 50.3% and 53.8% of initial values in MB and PB, respectively. Larger declines in rate of positivity were seen for smear samples at 1 and 6 months in both MB and PB but overall PCR positivity rates were lower than biopsy rates for M.leprae.

MI42

CONFIRMATION OF DIAGNOSIS IN MONO LESION LEPROSY CASES BY GENE AMPLIFICATION TECHNIQUES

V.M.Katoch, V.D.Sharma, H.B.Singh, K.Katoch, M.Natrajan, D.Singh, R.K.Sharma, and D.S.Chauhan

Central JALMA Inst. for Leprosy (ICMR), Taj Ganj, Agra-282 001 (U.P.) India

With the successful use of WHO MDT there have been major changes in the profile of leprosy. Most of new emerging cases present with single lesions. It is difficult to diagnose these cases as the clinical features are vague in most of such cases and histopathology is of nonspecific type. Various gene amplification techniques developed during the last decade may help in confirming the presence of gene sequences in these lesions. In this study, DNA as well as rRNA targetting amplification techniques have been evaluated for their usefulness in the diagnosis of these early forms. Biopsies from these suspected early leprosy cases attending OPD of our Institute were collected. Nucleic acids were extracted and fractionated by a physiohemical technique being used at our laboratory. A DNA targetting (Williams et al) and a RT-PCR targetting a part of 16S rRNA of M.leprae (standardised at our laboratory) have been tried to detect the presence of M.leprae sequences. Ribosomal targetting gene amplification assay was found to be slightly more sensitive (65%) than DNA targetting (55%) method. Results indicate a good potential for gene amplification techniques for confirmation of diagnosis of early leprosy.

MI43

ON THE NERVE LESIONS CAUSED BY A LEPROMA-DERIVED AND CULTIVATED MYCOBACTERIUM HI-75 PRODUCED IN MICE

Hamit Sidik, Yukihiro Furuno, Kenichiro Murata & Eiichi Matsuo

Department of Pathology, Kyorin University School of Medicine, Tokyo, Japan

The aim to make every experimental disease model has been the simulation of the pathognomonic lesion which characterize human disease by the simplest possible way. In leprosy, nerve lesions have been regarded as the one which characterize this disease. The present study was conducted to make the one modifying the methods to make experimental leprous lesions produced in nude and immunologically attenuated mice by Sasaki et al. by the inoculation of a leproma-derived and cultivated *mycobacterium HI-75* (HI-75) which was reported as *M. lepraе HI-75* by Skinsnes et al. including one of the present author (Matsuo E) in 1975 and was identified as *M. scrofulaceum* (MS) by Stanford et al. in 1977.

In this study 11 million in total of HI-75 mixed with hyaluronic acid were divided into two and injected into both upper lip of each female nude and SPF ddY(ddY) mice expecting the easier access of the bacilli to the sensory nerves and periodically examined the lesions in these portion histopathologically for a few months.

As the results, the lesions produced in nude and ddY were much different. In nude mice macrophages laden with abundant mycobacteria proliferated at the injection sites and in the limited cases and portions bacilli were seen in the endoneurium of tiny peripheral nerves. In ddY the abundant bacilli were often seen in the center of the granulomatous lesions which include the nerves with invaded AFB.

The questions arose from the results which should be solved to understand the pathologic mechanism of leprous neuropathy are firstly whether the mycobacteria other than the so-called *M. leprae* grow in nerves or not in certain conditions and secondly whether some of the mycobacteria might have the ability to transform into genetically different kind of those such as M.leprae or not.

MI44

LIMITED GROWTH OF *MYCOBACTERIUM LEPRAE* IN CELL-FREE LIQUID MEDIUM CONTAINING ADENOSINE

Masahiro Nakamura* and Masanori Matsuoka**

*Koga Hospital Medical Research Institute, Kurume 830-8577, Japan
**National Institute for Leprosy, 189-0002, Tokyo, Japan.

No credible reproducible *in vitro* multiplication of *M. leprae*, either in a tissue culture or in a cell-free culture system has been reported to date, despite more than 120 years since the discovery of the bacilli by Hansen in 1873. Here we report the first evidence that the cells of the Thai-53 strain of *M.leprae* can multiply in a cell-free liquid system, when the cells are cultured in enriched Kirchner medium, at pH 6.8-7.0, containing adenosine, at 30 C. For cultivation, we employed two methods; inoculation of the bacillary suspension into the medium, and cultivation of slide glasses smeared with the suspension of *M.leprae* in the medium. The results obtained indicated that the number of the cells morphologically increased with increasing cultivation period. A 2 to 4-fold increase in the DNA content extracted from the cultured cells specifically amplified by the PCR method, was observed after 6-8 weeks of cultivation. Moreover, an approximately 2-fold increase in the intracellular ATP content was demonstrated after 2 weeks' cultivation, and an approximately 4-fold increase after 4 weeks' cultivation. However, the ATP content gradually decreased thereafter, and no further increase in the ATP content could be achieved. Either AMP, ADP or ATP could be substituted for adenosine obtaining the same results. From these results, it was evident that initiation of the growth of *M.leprae* in a cell-free system took place when the cells were cultured in the liquid medium containing adenosine. The limit in growth after 6 weeks' cultivation has remained difficult to clarify, and further studies are required.

MI45

THE ANTIMYCOBACTERIAL ACTION OF AMPICILLIN/SULBACTAM IN CELL-FREE AND INTRACELLULAR SYSTEMS

K. Prabhakaran, E.B. Harris & B. Randhawa GWLHD Center @ LSU, Baton Rouge, LA 70894-5072, U S A.

We have demonstrated previously that ampicillin/sulbactam is bactericidal to drug-resistant *Mycobacterium leprae* multiplying in mice and *Mycobacterium tuberculosis* in vitro. Sporadic reports continue to appear of HD patients who relapse after undergoing multidrug therapy. Multidrug-resistant tuberculosis is becoming a world-wide problem now. A gene designated *mdr,* mediating multidrug resistance has been reported in bacteria. Recently, a bacterial protein LmrA that extrudes antibiotics from the cell was shown to be identical to the human multidrug efflux pump P-glycoprotein causing multidrug resistance in cancers. Drugs that kill multidrug-resistant microorganisms would be of use in controlling infections caused by them. ß-Lactam antibiotics are the most widely used antimicrobial agents. Since mycobacteria, including *M.leprae,* synthesize ß-lactamase, these drugs are inactive against them. Now, ß-lactam/ß-lactamase-inhibitors are being employed successfully to treat diseases caused by ß-lactamase-positive organisms. We screened the action of three ß-lactam/ß-lactamase-inhibitors [ampicillin/sulbactam (Unasyn®),amoxicillin/clavulanate (Augmentin®) and piperacillin/tazobactam (Zosyn®)] on four potentially-pathogenic (to humans or to animals) mycobacteria [*M.simiae, haemophilum,avium & microti*] in axenic cultures; the action of ampicillin/sulbactam was also tested against the mycobacteria phagocytized by macrophages. The mycobacteria were cultured axenically in 7H 9 medium with or without the drugs. The drugs suppressed the growth of the mycobacteria in the cultures; ampicillin/ sulbactam proved to be the most potent of the three drugs. In the acute phase of mycobacterial infections, the organisms multiply within macrophages. Peritoneal macrophages were harvested from BALB/c mice. The bacteria were exposed to monolayers of the cells in RPMI 10 medium. Unphagocytized bacilli were washed off. Three concentrations of ampicillin/sulbactam were tested. The drug killed 58-97% of the mycobacteria within the macrophages [assessed by CFU]. ß-Lactam/ß-lactamase-inhibitors, especially ampicillin/sulbactam might provide an alternative effective therapy against diseases caused by mycobacteria resistant to other drugs.

MI46

PROTEIN KINASE REGULATES PHAGOCYTOSIS OF *MYCOBACTERIUM LEPRAE* BY MACROPHAGES

K. Prabhakaran, E.B. Harris & B. Randhawa GWL HD Center @ LSU, Baton Rouge, LA 70894-5072, U S A.

Pathogenic bacteria have developed a variety of mechanisms to invade their hosts. Many intracellular microorganisms interact with host cell receptor molecules to induce their own internalization. Bacteria exploit eukaryotic protein kinases as part of a strategy to enter mammalian cells by stimulating these enzymes at the receptor sites in the host cells. Protein kinase inhibitors prevent cell infection by blocking bacterial internalization. *M.leprae* was purified from the foot pads of experimentally-infected *nu/nu* BALB/c mice. Peritoneal macrophages were collected from BALB/c mice, using heparinized Hanks' Balanced Salt Solution; the cells were sedimented by centrifugation at 200xg for 10 min at 4°C. The macrophages were suspended in a small volume of RPMI 1640 medium containing 15% heated fetal bovine serum, 20 mM HEPES, 2 mg/ml $NaHCO_3$, 2 mM glutamine and 50 µg/ml gentamycin. The number of cells in the medium was adjusted to $4x10^6$ /ml. A round 13 mm coverslip was introduced into each well of a 24-well tissue culture plate; 0.5 ml of the cell suspension was added to each well. After 2h, nonadherent cells were washed off. The inhibitors tested (staurosporine, genistein and erbstatin) were dissolved in 0.25% DMSO. Medium with DMSO was added to one set of 3 wells. Each inhibitor solution (0.5 ml) was added to three wells each. After 60 min, the wells were washed with PBS and then with the medium; 0.5 ml medium was added to each well. In another group, the wells were replenished with medium containing inhibitor. *M.leprae* ($2x10^7$/20 µl) was added to each well. After 2 h at 37°C, the cover slips were washed in PBS, and stained by the Ziehl-Neelsen method. The coverslips were photographed under high power. The control macrophages and those exposed to genistein showed good internalization of *M.leprae*. Phagocytosis of the bacteria was suppressed in the cells exposed to staurosporine and erbstatin, even when the inhibitors had been removed after preincubation. Different inhibitors act on different types of protein kinases. Further work will elucidate this. The results suggest that protein kinase regulates phagocytosis of *M.leprae* by macrophages.

MI47

GENOMIC IDENTIFICATION OF THE LEPROMA-DERIVED, CULTIVABLE AND NERVE INVADING *MYCOBACTERIUM HI-75* BY THE COMPLETE DNA SEQUENCING OF 16S RIBOSOMAL RNA GENE

Tetsuo Sakai[1], Hamit Sidik[2], Eiichi Matsuo[2], Akira Wakizaka[1]

[1]Dept. Biochem. Molec. Biol., and [2]Dept. Pathol., Kyorin Univ. Sch. Med., Tokyo, JAPAN

The complete sequence of 16S ribosomal RNA (16S rRNA) gene was analyzed with the leproma-derived and cultivable *Mycobacterium HI-75* (*M.HI-75*) in order to obtain its taxonomic characteristics by the direct sequencing of the polymerase chain reaction (PCR) products. The mycobacterium examined in this study was first isolated by Skinsnes *et al.** in 1975 from a lepromatous type Hansen's disease patient and was maintained in Ogawa's medium enriched with glucuronic acid and N-acetyl-D-glucosamine in one of the authors' laboratory. DNA extracted from the cultured bacilli was amplified by the PCR using five sets of primers. Thus obtained product was sequenced by the use of biotinylated and DyeAmidite-667 conjugated primers. The detected sequences of 16S rRNA were compared with the gene data base issued from GenBank and the published data by Rogall *et al.* The results revealed that the sequence of *M.HI-75* was most similar to that reported for *M. scrofulaceum* (*MS*) with 5 bases (0.35%) differences in the sequenced 1493 bases of 16S rRNA gene. *M. leprae* (*ML*) differed from *M.HI-75* with 47 bases (3.3%). Stanford *et al.* identified *M.HI-75* as *MS* in 1976 from their biochemical characteristics. Sasaki and Hamit reported the nerve invasion and the growth of the inoculated *M.HI-75* either to the nude mice or the ^{131}I treated immunocompromised Swiss mice. The results of this study indicates that *M.HI-75* is one of the variant of *MS* possessing an ability to invade into peripheral nerve, claiming a nature of a pathogen in developing leproma-like lesions.

Ref) *Skinsnes OK, Matsuo E, Chang PHC, Andersson B. Int J lepr 1975;43:193-209

MI48

A METHOD OF CHANGING REVERSION OF IN VITRO MORPHOLOGY OF CAN BACTERIA TO IN VIVO FORMS OF LEPROSY BACILLUS

Aninda Sen, A.Chakrabarti, A.N.Chakrabarty and Sujata G Dastidar#

Calcutta University College of Medicine and #Jadavpur University, Calcutta, India

Leprosy bacillus (LB) in vivo shows the preponderance of acid fast bacillary bodies. However, when cultivated in vitro, they show a reduction in typical lepra bacillary forms and a preponderance of mycelia, spores and granules. This has, for a long time, confused recognition of the in vitro cultivated chemoautotrophic nocardioform (CAN) bacteria as the counterpart of the LB. We report on selective in vitro cultivation conditions which help revert the CAN bacteria to in vivo morphology.

Gelatin minimal (GM) medium supplemented with sodium palmitate was further supplemented with 5% Dextrin, 2% Fructose, Actinomycin D at 50 µg/ml concentration and this medium was inoculated with 10^4- 10^6 CFU/ml of in vitro maintained CAN bacteria which was allowed to grow for 4-6 weeks. Morphology was studied every week by staining with acid fast stain, Gram stain and Giemsa stain. Control medium was GM without these supplements. The results showed unequivocal reversion of in vitro non-acid fast bacillary, mycelial and granular forms of CAN bacteria to typical acid fast bacilli seen in vivo in LL leproma. The role of individual factor by a process of elimination has been determined and evaluated.

MI49

OXIDATION OF ^{14}C-PALMITATE AS AN INDEX OF INFECTIVITY AND VIABILITY OF 'FAST' AND 'SLOW' GROWING M. LEPRAE ISOLATES.

R.W. Truman, S.G. Franzblau, R.M. Sanchez, A. Biswas.

G.W.L. Hansen's Disease Center, Baton Rouge, Louisiana, USA.

Though there are as yet no recognized strains of *M. leprae*, variants which exhibit 'fast' or 'slow' growth in the mouse foot pad have been described. The factors which underlie these variant traits are not yet understood. We compared the metabolic activity and infectivity of different preparations of *M. leprae* including known 'fast' and 'slow' growing isolates. Inocula were compared between freshly harvested *M. leprae* with tissue preparations and suspensions preserved at different temperatures and times. A number of good handling practices are noted. Metabolic activity was assessed as the relative ability of 10^7 *M. leprae* to oxidize ^{14}C-Palmitate in Middlebrook 7H12 (BacTec) incubated at 33C and was expressed as a growth index (GI). Infectivity was determined using the mouse foot pad technique. Armadillos were inoculated with some preparations. The metabolic activity of *M. leprae* varied markedly by its tissue of origin, means of preparation, duration of storage, and general character of the tissue from which it was derived. The GI of freshly harvested preparations were roughly bimodally correlated with infectivity. Preparations with low GI tended to show poor to no growth upon reinoculation into animals while those with high GI usually achieved good growth results. Above or below a threshold, the GI was not proportional to growth rate and was not associated with 'fast' or 'slow' growth characteristics of different isolates. Preparations held at 4-33C showed first an increase and then a gradual decline in GI over a 4 week period, but infectivity was lost rapidly and generally eliminated by 3 weeks. Preparations held at 4C for less than 7 days retained best infectivity. Metabolic activity was not detectable following a single freeze-thaw of tissue or bacillary suspension and was generally associated with a 99% or greater decline in infectivity. Growth results achievable after inoculation of armadillos and mice were comparable. Oxidation of ^{14}C-palmitate can be used effectively as a relative measure of the quality of *M. leprae* preparations. The lack of linear correlation between metabolic activity and 'fast' or 'slow' growth characteristic suggests that differential growth rates are inherent and may be useful markers to help identify strain variants.

MI50

CULTURE AND PATHOGENIC CHARACTERISTICS OF THE *MYCOBACTERIUM LEPRAE* ISOLATE "THAI-53" IN ARMADILLOS (*DASYPUS NOVEMCINCTUS*).

R.W. Truman, D.M. Scollard, R.M. Sanchez.
GWL Hansen's Disease Center, Baton Rouge, Louisiana, USA

Though no genetic variation has been detected in *M.leprae* from different patients, regions and animal hosts, some isolates can be distinguished by their differential growth rates the mouse foot pad. Thai-53-*M. leprae* is a well characterized "fast" growing isolate commonly propagated in athymic nude mice. To determine its pathogenic characteristics in another host we inoculated 2 groups of 10 armadillos with 1.9 X 10^7 bacilli and compared their time course of serological, hematological and histopathological events of their infection with those of other animals inoculated with bacilli passaged from humans to armadillos. Thai-53 showed high metabolic activity for oxidation of ^{14}C-palmitate. Consistent with its growth characteristics in the nude mouse, Thai-53 inoculated armadillos showed more a rapid progression of infection, developing fully disseminated leprosy within 8-12 months with all classical signs of the disease. Serological antibody profiles for infection with Thai-53 were low and inconsistent in comparison to that seen with other isolates and the bacilli did not commonly disseminate to distant somatic sites prior to the animals entering the terminal stages of disease. Necropsy examination showed that armadillos infected with Thai-53 had extensive neurological involvement. Interspecies transfer of bacilli do not effect their overt pathogenicity and similar culture characteristic can be observed in different hosts.

MI51

EFFECT OF UV RADIATION ON *MYCOBACTERIUM LEPRAE*.

R.W. Truman, T.P. Gillis

G.W. Long Hansen's Disease Center, Baton Rouge, La. USA

The relative importance in leprosy transmission of contaminated dust, droplets or fomites remain unclear. *Mycobacterium leprae* is an extremely slow growing obligate intracellular parasite which is yet to be cultivated on artificial media. Several environmental factors could limit its transmissibility and survival in nature including its tolerance to ultraviolet radiation (UV). In the laboratory, UV-C is generally recognized as a potent sterilizing aid but its effectiveness against *M. leprae* also has not been shown. We examined the influence of UV on the growth and metabolic activity of *M. leprae*. Temporary static cultures in 10x35mm polystyrene petri dishes with 500 ul 7H12 media containing $1x10^4$ *M. leprae* obtained from foot pads of nude mice were exposed to varying timed intervals of UV radiation generated from an artificial source. Exposure times ranged from 0-80 seconds and constituted doses totaling from 0-12.64x10^4 ERGS/cm^2. The bacilli were immediately resuspended and $1x10^7$ organisms from each exposure dose were inoculated into BacTec 12B vials to assess for metabolic effects. Another $1x10^4$ bacilli from each exposure were inoculated into the foot pads of Balb/c mice (MFP) to assess long term effects on cell division. The growth index achieved in BacTec cultures showed an immediate dose response related decline to a minimum of about 50% of the control activity after exposure to 6.3x10^4 ERGS/cm^2. MFP results assessing cell growth were similar and showed that doses of 3x10^4 ERGS/cm^2 resulted in a 90% killing and 6.3x10^4 ERGS/cm^2 killed 99%. *M. leprae* shows sensitivity to UV-C similar to *M. tuberculosis* and lacks mechanisms that might allow it to substantially avoid UV injury.

MI52

RAPID DETECTION OF RIFAMPIN RESISTANCE IN MYCOBACTERIAL PATHOGENS: EVALUATION OF PCR/UHG-RIF ASSAY

Diana L. Williams, Laynette Spring and Thomas P. Gillis

Molecular Biology Research Department, Laboratory Research Branch, G.W.L. Hansen's Disease Center, School of Veterinary Medicine, Louisiana State University, P.O. Box 25072, Baton Rouge, Louisiana 70894

Rifampin resistance in *Mycobacterium leprae* and *Mycobacterium tuberculosis* has been attributed to missense mutations within an 81 base pair fragment of *rpoB* (Rif region), encoding the *B*-subunit of the DNA-dependent RNA polymerase. Using this information, we have developed and characterized DNA-based assays using heminested PCR and universal heteroduplex generator (PCR/UHG-Rif) for the rapid detection and rifampin-susceptibility of *Mycobacterium tuberculosis* and *Mycobacterium leprae* in clinical specimens. In a double-blind study, 655 sputum specimens were obtained from individuals suspected of having tuberculosis and analyzed for the presence of *M. tuberculosis* and rifampin-susceptibility using the PCR/UHG-Rif assay. Results of this study demonstrated that the PCR/UHG-Rif assay detected all smear-positive, culture-positive specimens containing *M. tuberculosis*. In addition, 50% of smear-negative, culture-positive specimens for *M. tuberculosis* were detected. This assay also correctly identified the rifampin susceptibility of *M. tuberculosis* from 98% of these specimens. All specimens containing only nontuberculous mycobacteria or no acid-fast bacilli were negative in the PCR/UHG-Rif assay. The presence of *M. tuberculosis* in culture-negative specimens from patients with previous culture-positive specimens but receiving anti-tuberculosis therapy when specimens were obtained for PCR/UHG-Rif testing was detected by the use of this assay. In addition, PCR amplification primers and conditions were modified to specifically amplify and detect the rifampin-susceptibility of *Mycobacterium leprae* in purified DNA samples and crude cell lysates of skin biopsy specimens from lepromatous leprosy patients. Even though, a small number of rifampin-resistant clinical specimens were available for analyses (no. = 4), the PCR/UHG-Rif assay correctly identified the rifampin susceptibility of these specimens. These assays require approximately six hours to run (post sample preparation) and should provide rapid tools for detection of the rifampin-resistant phenotype of these mycobacterial pathogens directly from clinical specimens.

MI53

PREPARATION AND APPLICATION STUDY ON a2 ANTIGEN OF MYCOBACTERIUM LEPRAE

Yin Yueping, Suzuki Yasuhiko, Makino Masanao, Wu Qinxue and Hou Wei
Institute of Dermatology, CAMS & PUMC, Nanjing, China

The a antigen gene is one of the dominant mycobacterial proteins those are secreted from the mycobacteria. In the course of our study, we have constructed the genomic libray of M. leprae Thai 53 strain, cloned a new a antigen gene with a plaque hybridization method using DNA fragment of M. leprae al antigen DNA as a probe and termed it as a2 antigen gene. The a2 antigen gene was characterized by sequencing. By comparing the deduced amino acid sequence of a antigen with 85 complex antigen of other mycobacteria, the homology of 74.3%-85% was found.

The over expression system of M.leprae a2 antigen gene in Escherichia coli was constructed. Recombinant a2 antigen was purified by amylose column chromatograph at the purity of more than 95%.More than 10mg of recombinant a2 antigen has been obtained from 200ml of liquid culture. Then we studied the serological activity of recombinant M. leprae a2 antigen using enzyme-linked immunosorbent assay (a2-ELISA) in sera from 100 leprosy cases and 50 normal persons, and determined the optimum conditions for a2-ELISA.The results indicated: the antibody titer to a2 antigen in leprosy patients was IgG>IgM>IgA>and there was same serological activity between a2-ELISA and ND-ELISA. These results suggested that the a2-ELISA may be useful for the serodiagnosis in leprosy.

MI54

A METHOD OF STORING LEPROMAS

A A Juscenko

Leprosy Research Institute, Astrakhan, Russia

Foot pad technic of M.leprae inoculation of mice(Shepard, 1960) permitted to study M.leprae survival in different environments. Through many years' experiments we succeeded in confirming a survival of M.leprae under the conditions when biopsies from untreated LL patients were put into 40% saline solution of glycerin (in refrigerator or at room temperature). In past this method was used for preserving viability of different organisms including M.lepraemurium (Marchoux, 1934; Chorine, 1934). At the moment of biopsy, then in three and subsequently in every six months M.leprae (10^4) from lepromas were inoculated into 10 BALB/c mice by Shepard's technic. Inoculum and "harvests" were counted according to Shepard and McRae (1968). During the initial 12-24 months characteristics of M.leprae multiplication in mice foot pads (lag-phase, log-phase and plato phase) did not almost change in the most of cases. After 3-4 years of storing an amount of M.leprae increased more slowly. Preliminary results of these experiments were published in 1984. Maximal period during which it was succeeded to preserve M.leprae viability in 40% glycerin at room t^0 was 12 years (longer experiments were not carried out). The results obtained could account for some unsolved questions of epidemiology and pathogenesis of leprosy. The method proposed is successfully used for transportation of infected tissues from leprosy patients without ice from any region of Russia to Leprosy Research Institute (Astrakhan) for studying. During a special study (Vishnevetsky & Juscenko, 1991) it was also proved that lepromas kept in 60-80% solution of glycerin at room temperature for 2-4 weeks remain suitable for enzyme and histochemical investigations.

PATHOLOGY

PA01

HISTOPATHOLOGIC FINDINGS OF IRIDOCYCLITIS IN LEPROMATOUS LEPROSY

C.K. Job[1], K. Thompson[2], E. Daniel[3] and J. Ebenezer[3]

[1]St. Thomas Hospital and Leprosy Center, Chettaputtu; [2]Leprosy Home and Hospital, The Leprosy Mission, Purulia; and [3]S.L. R&T.C., Karigiri, INDIA

Cataract is found to be a common complication in lepromatous patients belonging to the older age group. During cataract surgery an iridectomy is performed as a routine procedure. The iris specimens obtained from lepromatous patients undergoing cataract surgery are studied histopathologically using hemoloxylin eosin stain and acid fast stain. Iris atrophy with evidence of chronic inflammation was found in a majority of patients even in the absence of acid fast organisms. In one specimen active inflammation with macrophage granuloma infiltrating the iris tissue including constrictor muscles was noticed. Acid fast organisms were present in large numbers inside macrophages and in bundles of smooth muscle cells regulating the pupil. Nerve fibers were not detected. Details of these findings will be presented and their significance will be discussed.

PA02

In severe ENL reactions we found acute necrotizing and exsudative vasculitis in deep dermis and subcutis. These vasculitis follow severe acute inflammatory reactions in the neighboring tissues. We describe in 10 lepromatous leprosy patients, many years after discharge, episodes of one or few erythematous nodules in the limbs. Microscopical examina - tion revealed a exsudative and necrotizing segmentary vasculitis like Polyarteritis nodosa.
There are discrete inflammatory reaction in dermis and sub - Cutis and the clinical data, residual lepromatous infiltrate and Bacili in vessel's wall sugests a late ENL reaction

PA03

Theren't envolvement of Central nervous system, peripheral nervous systems, skin, muscles and lungs in secondary amyloidosis in leprosy. In these sites the blood capillaries shows tigh junctions between the endothelial cells and the transport is made by pinocitosis. Otherwise in sites where blood capillaries are fenestrate (kidneys, bowel, endocrine glands) or sinusoids (liver , spleen , bone marrow) the Amyloid deposition is ever present and frequently massive. The amyloidogenic SAA protein is produced in the liver, their molecular weight is 250.000 and is found in the blood as a apolipoproteic complex. This suggests that there are a relationship between the size of the precursor protein molecule and capillary pattern in the distribution of amyloid deposition in leprosy

PA04

Acute cutaneous and neural lesions are the know signs of type I reactions. Theren't reports about visceral lesions during these episodes. We detected visceral tuberculoid granulomatous lesions in six patients that died during type I reactions. In these cases we considered these reactions as reversal reactions because all the patients developped previously cutaneous lesions and stigmata characteristic of lepromatous patients. We didn't found uniformity in the anatomic and clinic data of these patients. So, one patient presented both , ENL and type I reaction; na elderly patient presented a tuberculous lymmphadenitis that was follow by a generalized granulomatous lesions, with prominent granulomatous vasculitis in skin, nerves, synovial membranes and visceral sites (liver, spleen, testis, larinx); other patient had a generalized tuberculoid granulomatous have followed a characteristic episode of sulphona syndrome. M. leprae was found in the tuberculoid granulomatous lesions In all the patients , including in two patients the tuberculoid granuloma developped in kidneys , heart and salivary glands

PA05

HISTOLOGICAL CHANGES IN THE NASAL MUCOSA OF PATIENTS WITH PRIMARY NEURITIC LEPROSY

Sujai Suneetha, S Arunthathi, Anand Job, Anand Date, Nisha Kurian, Chinoy JG Chacko.

Dhoolpet Leprosy Research Centre, LEPRA India, Hyderabad-6, INDIA.
and
Schieffelin Leprosy Research & Training Centre, Karigiri, INDIA.

The nasal mucosa of 39 cases of primary neuritic leprosy registered at the Schieffelin Leprosy Research & Training Centre, Karigiri were studied histologically to determine nasal mucosal involvement in PNL and its relevance to the pathogenesis of the disease. Specific changes of leprosy were seen in 20(51.3%) biopsies ranging from macrophage granuloma with acid fast bacilli, epithelioid granulomas and nerve inflammation. The remaining biopsies revealed chronic inflammatory changes of the mucosa or mild non-specific changes in small mucosal nerves.

These findings show that there are widespread effects of the disease even in PNL patients where the disease is believed to be confined to the peripheral nerves. The findings also show that early leprosy involvement can be found in the nasal mucosa even before lesions become apparent in the skin, nerve or other parts of the body. The nasal mucosa could be the site for the primary lesion in leprosy. Clinical and histological examination of the nasal mucosa may be useful and important in the early diagnosis of leprosy and especially in contacts.

PA06

SIGNIFICANCE OF PLASMA CELLS IN HISTOLOGICAL CLASSIFICATION OF LEPROSY

G. Lakshmi Rajan

Pathology Department, Christian Medical College, Vellore India.

Leprosy with varied clinical manifestations, necessities the establishment of a reliable classification for appropriate treatment and assessment of prognosis. The clinical presentation and the histology of skin lesions reflects the underlying immunological response against M. leprae. This study aims at evaluating the significance of plasma cells in classifying leprosy histologically.

Biopsies of skin lesions from 70 untreated leprosy patients consisting of: 15 patients with indeterminate leprosy, 15 with tuberculoid leprosy, 15 with borderline tuberculoid leprosy, 10 with borderline lepromatous leprosy and 15 with lepromatous leprosy were studies. The plasma cells in them were enumerated in 20 HPF in each biopsy. The results of the study showed that plasma cell density was significantly high in multibacillary groups and declined towards the tuberculoid and indeterminate end of the spectrum.

The high plasma cell count in histological sections of the skin of multibacillary patients may be a reflection of the underlying active humoral immune mechanism of the body against M. leprae. The increase numbers of plasma cells in association with other cellular infiltrates of lepromatous leprosy and high bacillary load may be an useful indicator in differentiating the various types of leprosy and arriving at a proper classification of the disease subtype.

PA07

LOCALIZATION OF *M. leprae* TO EPINEURAL BLOOD VESSELS IN EXPERIMENTAL LEPROSY NEURITIS.

D. M. Scollard, G. T. McCormick, and J. L. Allen.

Department of Pathology, GWL Hansen's Disease Center at LSU, Baton Rouge, LA.

Background. Infection of peripheral nerve by *M. leprae* is the histopathologic hallmark of leprosy and is a major factor in the deformity and social opprobrium of this disease, but the mechanisms by which the bacillus localizes to peripheral nerve are not known. We have shown that nerve involvement in experimentally infected armadillos is very similar to that in man.
Objective. Since the early neural accumulation of *M. leprae* in the armadillo is to the epineurium, we have used high resolution light microscopy and electron microscopy to determine the cellular location of epineural bacilli.
Methods. From 8 infected armadillos, 44 nerves were divided into 1 cm. blocks and processed in Spurr resin. Thick (1.5 μ) sections were screened for acid-fast bacilli, and thin sections of positive specimens were examined ultrastructurally.
Results. Over 600 blocks were screened; 36% contained acid-fast bacilli, and 86% of these contained epineural organisms. Most epineural *M. leprae* were found in the endothelium of blood vessels or in histiocytes in the adventitia. Some were found in epineural lymphatics. Within nerves, *M. leprae* were found in the vascular endothelium as well as in Schwann cells and histiocytes.
Conclusions. These results indicate that *M. leprae* localize to epineural blood vessels during the development of neuritis in leprosy. Specific interaction of neural vascular endothelium with *M. leprae* alone, or with infected monocytes, may therefore be a critical step in the pathogenesis of nerve injury in leprosy.

PA08

INFECTION OF DISTAL PERIPHERAL NERVES BY *M. leprae* IN ARMADILLOS: AN EXPERIMENTAL MODEL OF NERVE INVOLVEMENT IN LEPROSY.

D. M. Scollard, G. Lathrop, and R. W. Truman. Research Branch, GWL Hansen's Disease Center at LSU, Baton Rouge, La.

Background. No model has been developed to study the mechanisms by which *M. leprae* localizes selectively to peripheral nerve.
Objective: To determine the pattern and distribution of nerve localization of *M. leprae* in the armadillo model.
Design. Dissection of major peripheral nerves, from the spinal root to ramifications in the feet, was done in 6 exper-mentally infected armadillos. Nerves were divided into 1 cm blocks, and in Fite-stained sections were evaluated.
Results. Peripheral nerves were involved by *M. leprae* in 3 animals with disseminated infection. Infection increased in intensity as the

nerve was followed distally. No *M. leprae* were found in 3 resistant animals. The extent of infection was greater epineurally than intraneurally, at all levels. *M. leprae* infection of nerves was associated with focal, interstitial, mononuclear cell infiltrates. Conclusions. These results suggest that: 1) Armadillos offer a model for the study of neural involvement in leprosy, since the pattern of neural involvement is comparable in man and susceptible armadillos; 2) Early localization of *M. leprae* may be epineural; 3) Schwann cell involvement may be a late event; 4) Mechanisms involving the endothelium of epi- and peri-neural tissues may be important in the selective epineural localization of *M. leprae*.

PA09

ROLE OF PCR IN THE DIAGNOSIS OF EARLY LEPROSY

Charles K. Job[1], Joseph Jayakumar[1], Diana Williams[2] and Thomas P. Gillis[2]

[1]St. Thomas Hospital and Leprosy Center, Chettupattu, India and [2]Molecular Biology Research Department, Laboratory Research Branch, GWL Hansen's Disease Center at LSU, P.O. Box 25027, Baton Rouge, LA

Early detection of leprosy has become a major focus for improving control strategies for this disease. We evaluated a polymerase chain reaction (PCR) test for detecting *Mycobacterium leprae* in skin as an adjunct to standard clinical and histopathological evaluation of early lesions for diagnostic purposes. Skin biopsies of lesions from 39 patients suspected of early leprosy were taken and bisected. One piece was used for histologic examination and the other for PCR studies to detect *M. leprae*. The diagnosis of leprosy was made clinically in 14 patients and by histopathologic study in 26 patients. Acid-fast bacilli were seen in the histopathologic sections of only two patients and *M. leprae* were detected using PCR in 11 patients. In one patient the diagnosis of leprosy was made only because of the detection of *M. leprae* by PCR. Since even in endemic countries the profile of leprosy is changing, detection of leprosy in its early stages has become increasingly important. Since the finding of *M. leprae* is crucial in the confirmatory diagnosis of early leprosy, it is suggested that PCR studies to detect *M. leprae* be done wherever possible in conjunction with histopathologic examination. It is also recommended that the feasibility and the cost-effectiveness of both of these methods to find *M. leprae* be evaluated in other settings.

PA10

HISTOPATHOLOGIC CHANGES OF SKIN LESIONS IN RELAPSED BORDERLINE TUBERCULOID PATIENTS

C.K. Job, J. Jeyakumar and M. Aschhoff.

St. Thomas Hospital and Leprosy Centre, Chettupattu, India.

Ten patients belonging to the paucibacillary group who had relapsed after receiving 6 months of multidrug therapy are chosen for the study. Clinically patients with renewed activity, extension of the original lesions and appearance of new lesions are considered to have a relapse of the disease. Skin biopsies from these active lesions are studied histopathologically using hemotoxylin eosin stain, acid fast stain and van Gieson stain. The appearance and the content of the granuloma and the appearance of skin adnexa especially the blood vessels and dermal nerves in relapsed skin lesions will be described. Distinguishing features of relapsed lesions will be pointed out. The role of histopathologic study of skin lesions in identifying relapse will be discussed.

PA11

HISTOLOGICAL EVOLUTION OF REACTIVATION OF HANSEN'S DISEASE DURING OR AFTER TREATMENT

Maria Angela Bianconcini Trindade, Raul Negrão Fleury, Maria Mercedes Loureiro Escuder, Cássio Cesar Ghidella, João Carlos Regazzi Avellera, Francisco Reis Viana, Alfredo Bolchat Marques, Somei Ura
Instituto Lauro de Souza Lima, Bauru / Escola Paulista de Medicina, São Paulo, SP, Brasil

Reactivation in Hansen's disease has been reported since the dapsone era but after the introduction of MDT, with a prompt and effective cure, reactivation become an important research topic for control programs.
Aiming to analyze the histological pattern of reactivation, the histological evolution of Hansen's Disease was studied in 179 biopsies of 66 individuals presenting reactivation during or after treatment. Such biopsies were examined in the Instituto Lauro de Souza Lima between 1987 and 1994. Relapse occurred in 9 individuals not treated with MDT and was solely detected by the bacillary index. The intensity of the reactivation episode seems to be related to the cell immune resistance of the individual and depends on the amount of accumulated antigen. The analysis of the biopsies in this study confirms the difficulty in to differentiate activity, reaction and relapse and the correct allocation of these cases in the spectrum of the disease. It was not possible to distinguish between relapse and acute reactivation (type 1 reaction) in histological and clinical terms. This fact lead to the conclusion that reactivations are bacillary proliferation due to drug resistance or multiplication of persisting *M. Leprae*.

PA12

LABORATORY METHODS IN DIAGNOSIS OF LEPROSY RELAPSE

Weng Xiao-Man, Li Huan-Ying, Li Fu-Tian, Ran Shun-Peng — Beijing Tropical Medicine Research Institute; Shanghai Zun-Yi leprosy Hospital; Wenshan Prefectural Institute of Dermatology, Yunnan Province

The diagnosis of relapse in leprosy can be difficult, if relying solely upon clinical examinations. In order to detect relapse early and to differentiate relapse from late reversal reactions, laboratory methods such as PCR, Dot ELISA/ECL were applied to detect *M. leprae* and PGL-1 antigen in nasal secretions and slit-skin smears, as well as histopathological methods to detect PGL-1 antigen and S-100 protein in skin biopsies. The results on 33 relapses from patients cured with dapsone plus rifampin therapy were found as follows:
1. PCR is more sensitive than acid-fast staining (PCR 27/29, 93.1%; AF 29/33, 87.9%), but PCR method basing upon DNA amplification, cannot differentiate live from dead bacilli.
2. PGL-1 antigen can be detected in nasal and skin smears with Dot-ELISA/ECL and that PGL antigen appeared in 3 relapses from nasal secretion and slit-skin smear before overt signs of relapse developed.
3. Immuno-histochemical methods with PGL-1 monoclonal antibody (DZ-1) and S-100 protein antibody can not only reveal clearly cutaneous nerve but also demonstrate the location of PGL-1 antigen in relation to cutaneous nerve.
In 89.5% of relapses (MB 16, PB 2, unclassified 1) , PGL-1 were demonstrated in in skin smear by Dot-ELISA/ECL and/or immunochemical methods.
The combination of the above tests with routine clinical and AF examinations may be of advantage in the early diagnosis of relapse, as disagreement between slit-skin-smear and histopathology can occur in the early stage of relapse. Four suspected relapses suplemented with the above testes and negative findings were thus diagnosed as late reversal reactions. These preliminary results indicate that further testing on more samples are necessary.

PA13

RELATIONSHIP BETWEEN PATHOLOGICAL AND CLINICAL MANIFESTATIONS IN MB PATIENTS DURING MDT

Jia-ju Ma, Yun-shan Deng* , Cun-xin He, Xiu-lian Zhang, Yi Yin, Fa-de Men and Li-hong Sun
Hanzhong Sanatorium, Hanzhong City, Shanxi Province, China
* Xi'an Medical University, Xi'an City

Pathological, bacteriological and clinical changes and their relationships were prospectively studied qualitatively and quantitively in 104 MB leprosy patients after MDT. They were grouped according to homologdus matched-pairs and different clinical results. Results showed that: a decrease of GF, BIG, LHI and BI negatively correlated with the duration of MDT treatment; area of pathological infiltration obviously shrank and number of Virchow cell infiltration reduced; clinical effect rate of MDT was 100% after 24 months' treatment, of whom 12.5% reached the criteria of clinical cure. The authors recognized that pathological, bacteriological and clinical changes were closely identified each other after MDT; regularity of bacteriological changes and effect of MDT were better reflected by GF and BIG; GF and LHI could reflect the effect of MDT only in a short period; MDT had good anti-bacteria and anti-inflammation functions, and can kill the bacteria in the beginning of this treatment; different clinical results were related to the different levels of pathological damages and the number of bacteria; the lower all the indexes were, more effective the treatment could be; measurement of infiltration area was helpful in evaluating the clinical effects and the number of Virchow cell was likely not related with the evaluation mentioned; localized granuloma and the degenerated specific infiltration cells will existed continueously after MDT, but was not likely important for the evaluation of clinical effects.

PA14

CLINICO-PATHOLOGICAL CORRELATIONS OF MACULAR LESIONS IN LEPROSY, BEFORE AND AFTER MULTI-DRUG THERAPY.

Mohan Z.Mani

Christian Medical College and Hospital, Ludhiana Punjab, India, Pin: 141 008.

The clinical features and histopathology were studied in detail in 27 patients (24 new and 3 old) of bacteriologically negative macular forms of leprosy (macular tuberculoid or maculo-anaesthetic) with a view to clinico-pathological correlation before starting treatment here. In addition, repeat biopsies (one or more) were performed from the same lesions in 16 new patients and 2 old patients, who were taking regular multi-drug therapy here, usually after a variable period of daily rifampicin. In general, there was no absolute correlation of the type/severity of dermal infiltrate (round cell or granuloma) and intensity of cutaneous nerve infiltration between patients with and without deformities. However, out of 11 patients with deformities (8 new and 3 old) at least 7 patients had significant granuloma formation and nerve infiltration in their biopsies, in contrast to the group without deformities, in whom only a smaller proportion had such changes. A pronounced linear perivascular infiltrate in the papillary dermis was observed in several patients. In many patients the hypopigmented macules improved after treatment and the repeat biopsies usually showed decreasing dermal infiltrates.

PA15

EXPRESION DE LAS CELULAS DEL SISTEMA MONOCITO-MACROFAGO EN EL ESPECTRO INMUNOPATOLOGICO DE LA LEPRA: ESTUDIO INMUNOHISTOQUIMICO.

[1]Cuevas Santos J., [2]Contreras Rubio F., [3]Gómez Echevarría J.R., Torres Muñoz P., Hernández Ramos J.

[1]Hospital General Universitario, Guadalajara, Serv. Anatomía Patológica. [2]Hospital La Paz, Madrid, Serv. Anatomía Patológica. [3]Sanatorio San Francisco de Borja, Fontilles, Alicante, España.

Se trabaja con un material de 115 biopsias, de pacientes diagnosticados clínicamente de lepra. Todos ellos tienen valoración clínica, bacteriológica y alguno de ellos inmunológica (R. Mitsuda).

En la parte histológica se presenta valoración convencional de las lesiones desde el punto de vista histológico con las técnicas de HE Y Fite (búsqueda de bacilos) realizando el citado estudio sin conocer en un primer momento los datos clínicos. El trabajo evaluará todos los casos motivos del presente estudio con la consiguiente correlación clínico-patológica al contrastar los hallazgos histológicos y los datos clínicos. A posteriori se realizará una selección de los casos más significativos procurando recoger ejemplos de la totalidad del espectro de la lepra. El número pensado para tal selección oscila alrededor de 30 casos. De estos se realizará estudio inmunohistoquímico intentando valorar la expresión del macrófago en la lepra, con especial hincapié en la vertiente tuberculoide del espectro así como en los casos etiquetados como dimorfos, mediante anticuerpos mono y policlonales.

Relación de Anticuerpos primarios a emplear: Proteina S-100, CDIa, CD-68, HLA-DR (Mb3), Factor XIII4.

PA16

POLARIZED MICROSCOPIC OBSERVATION OF AMYLOIDOSIS

Mutsuhiro Furuta[1], Kentaro Hatano[1], Takanobu Matsuki[1], Yoshiko Okano[1], Koichi Nakaya[2], Takeshi Ikeda[2], Masahiro Fujino[2], Masanao Makino[1],

[1]National Sanatorium Oku-komyo-en, Okayama, Japan

[2]National Kyoto-minami Hospital, Kyoto, Japan

In the 1975 issue of the International Journal of Leprosy (Volume 43, Number 2), we reported " Amyloidosis in Leprosy" Recently, in Oku-komyo-en National Sanatorium, we could not perform autopsys for all cases. So it is not clear as before how often amyloidosis occur. But it dose not mean that amyloidosis has ever faded away. We had a prominent case of amyloidosis recently, and examined the tissue not only using HE stain and amyloid stain but also using the polarized microscope of the non-stain materials. And some eminent cases of the past are examined again in same manner. As a result, without using amylod stain, we found the existence of the amyloid degeneration by non stain materials. Over more as the degenerated lesion of the connective fibers connected to the amyloid deposition also shows polarization, we got the impression that is quite differ from amyloid stain observation.

It has been said that the secondary amyloidosis is related to AA amyloid. We think that amyloidosis spreads by the pathologic change mainly of the small blood vessels. In other words, the existence of the wound infection of the leprosy and other cases of so called secondary amyloidosis has the important correlation with the emergence of amyloidosis.

PA17

THE POLARIZED SUBSTANCES SEEN IN THE TISSUE OF LEPROSY RENDERING THE CHRACTER OF APOPTOSIS.

Kentaro Hatano, Takanobu Matsuki, Tomohiko Saito, Masanao Makino, Mutsuhiro Furuta

National Sanatorium Oku-komyo-en, Okayama, Japan

We would like to report the result of the pathological findings of the leprosy tissue, which seem to imply the correlation to apoptosis.

We have been observing in the tissue of a leprosy patient the existence of microscopic fine particles that have the character of polarization. Having obtained fifteen skin biopsies of the leprosy patients for diagnostic purpose, whose treatment was just about to start, or just after the onset of the treatment. Our observation was done using a polarized microscope and stain such as TUNEL, Fas, Bax, and Bcl-2. We also observed above tissue by using electron microscope. These biopsies were all taken from the margin of the skin lesion conjugating with the healthy skin.

As we try to find what this microscopic fine particles are that has the polarizing character, we observed the substance which has the positive reaction to the TUNEL, Fas, and Bax. Also in the investigation using the electron microscope, we found the electron dense materials which looked like apoptotic body and also a concentrated nucleus.

These results were equally seen in all the biopsies regardless of patient's age, sex, classification, and the lesion, thus enhancing the suspect of apoptosis which affects as the common mechanism in the pathology of leprosy.

PA18

HISTOPATHOLOGICAL AND TRANSMISSIONAL ELECTRON MICROSCOPICAL OBSERVATION ON THE LEPROTIC LESIONS IN SCROTUM WITH DEEP INFILTRATION

Liu Ji-be, Li Wen-zhong, Zhang Guo-cheng, Kong Qing-ying and Ye Gan-yun

Institute of Dermatology, Chinese Academy of Medical Sciences and Peking Union Medical College, Nanjing, China

In this article, a case of borderline lepromatous leprosy with histoid leproma was reported, who had also deeply infiltrated lesions in scrotum. After MDT therapy for one and half a year, most lesions disappeared, but that in scrotum with deep infitration very slowly.

Histopatholoical observation revealed the scattered, degenerative foamy cells and the residual leprosy bacilli in smooth muscle cells in addition to the foamy cell infiltrates in subcutis of the lesions.

On transmission electron microscopy,vacuoles with various sizes, grouped or scattered leprosy bacilli of granular and solid type were seen. The latter had electronic density with peripheral transparent halo, indicating that they still had vital activity.

The authors emphasize that the treatment of this kind of leprosy patients had to be strengthened and it is important to pay further attention to the residual bacilli in leprosy control.

PSYCHO-SOCIAL

PS01

EPIDEMIOLOGICAL AND SOCIO-CULTURAL IMPACT OF THE SOCIAL MARKETING PROGRAMME FOR LEPROSY IN SRI LANKA

Penny Grewal[1], Nimal Kasturiaratchi[2], Padmini Gunawardene[3], Dayamal Dewapura[1], Sunil Settinayake[1], Lakshmi Somatunga[1], Mitchell Weiss[4], Vinya Ariyaratne[5]

[1]Novartis Foundation for Sustainable Development, Switzerland, [2]University of Peredeniya, Sri Lanka, [3]Swiss Tropical Institute, Switzerland, [4]Anti-Leprosy Campaign, Sri Lanka, , [5]University Sri Jaywardenepura, Sri Lanka

In 1990 a social marketing programme for leprosy was launched in Sri Lanka to detect and treat hidden cases. Social marketing aims to influence the voluntary behaviour of target audiences (e.g. encourage persons affected by leprosy to seek treatment) in order to improve their personal welfare (e.g. cure of leprosy without deformities) and that of their society (e.g. reduce the pool of infection). This involved creating awareness of the signs of leprosy, dispelling prejudices, improving access to treatment and strengthening the ability of the health services to deal with the new case load.

A study was carried out among 1,800 non-affected persons including school teachers and midwives in 1997, three years after discontinuation of the social advertising campaign in order to assess its residual impact on knowledge, socio-cultural attitudes and practice. Using the Explanatory Model Interview Catalogue framework, respondents were shown photographs of representative signs of leprosy and given information about symptoms to provide a focus for questions about possible diagnosis, cause, prognosis with treatment, social attitudes and sources of information. Narrative data was collected for a third of the sample.

The findings reveal the long term impact of an intensive campaign and the sustainability of changes in societal attitudes which have been extremely positive, particularly among midwives and school teachers. Minority ethnic groups, such as Muslims, however appear to have been relatively untouched by the campaign. This paper will focus on areas with significant improvements in knowledge, attitude and behaviour (e.g. recognition and medical recourse, prognosis) as well as findings indicating effects that fell short of expectations.

Leprosy has been eliminated from Sri Lanka and this paper will also discuss the epidemiological impact of the campaign.

PS02

LINGERING PROBLEMS OF POOR COMMUNITY PERCEPTION, DISCRIMINATION AND SOCIAL STIGMA AGAINST LEPROSY-A STUDY OF YOUTHS IN SOUTH-EASTERN NIGERIA.

M.M.Meremikwu, C.O.Odigwe,E.N.U.Ezedinachi, D.G.Nkanga and A.N.Meremikwu University of Calabar, Calabar, Nigeria.

It has been suggested that increasing demonstration of the curability of leprosy would lead to a positive change in social attitude to leprosy patients and a gradual reduction in the age-long social stigma against the disease. To assess the level of community perception and social stigmatization of leprosy against the background of the successful implementation of the WHO MDT Programme in Nigeria, using a semi-structured, validated questionnaire, we studied 657 youth (10-25 yrs; mean = 17.1 ± 6.6) who were students of five secondary schools in South-Eastern Nigeria. There were 344 (52.4%) male and 313 (47.6%) female. Most ascribed the cause of leprosy to worms (15.0%), virus (28.6%), evil spirits (15.8%) and a curse (6.0%), while a few (26.3%) suggested a bacterial agent. Frequency of responses on the modes of transmission were 33.8%, 18.1%, 15.8%, 13.5% and 9.8% for sharing food, breathing, act of witches, sharing a seat, and hand-shake respectively. The hospital (37.6%) Church (36.8%) and traditional healers (6.8%) were suggested as preferred treatment places; while 18.1% said there was no cure. Most would not share classroom seat (85.6%), bus seat (75.0%) or toilet seat (82.0%) with a person affected by leprosy; 82.0% would not even shake hands with them. The reasons for discrimination were fear of being affected by (67.6%), social stigma (40.0%), traditional belief (32.2%) and religious belief (18.3%). There is a great need for health education in this community to improve the epidemiologic knowledge of the disease, its curability and to reduce the level of social stigma against it.

PS03

COMMUNITY ACTIONS TOWARDS PATIENTS WITH LEPROSY IN EASTERN NEPAL

L. de Geus, H. de Stigter and M.L. Heynders.

Netherlands Leprosy Relief Association, Biratnagar, Nepal.

Many leprosy patients tell about the fear they have for actions taken by the community towards them. Different studies show that due to this patients try to hide their disease and subsequently stop taking their treatment. To see if this fear for community actions is based on real events, 300 community members were interviewed about actions taken by the community towards leprosy patient during the past 20 years. This resulted in 192 patient-stories in total.
The majority (94.8%) of the patients described had visible signs like patches (10%)or wounds and/or deformities (84.8%).
Of these patients 2.6% experienced only eating restrictions, 43.8% had to sit separately, were not allowed to enter people's homes or to touch other people, 29.2% was not allowed to enter a teashop, not allowed to use a public well, not allowed in social functions, problems to get medical care or had problems in their work and 12.5 % of the patients were send out of their village. These negative community actions have not changed during the past 20 years. Even last year 13% of the patients was exiled from the village.
Also it was found that once the community started taking actions towards a patient, this action continues forever.
What however has changed is that nowadays 34.3% of the patients receive positive support compared to only 16% of the patients 20 years ago. Main reason for community actions are: fear of infection by germs and transmission of the curse of God.
It can be concluded that the social stigma on leprosy is still present and that the statement "Once seen as a leper, always a leper" is still true. As actions by the community are taken towards patients with visible signs, it can be concluded that the prevention of wounds and deformities is of high priority in patient education. Patients should be counselled on how to deal with community actions.
A community programme should be developed in which cause and treatment of leprosy is explained. As knowledge alone is not enough to change the negative behavior towards leprosy patients, a more participatory approach should be developed.

PS04

THE SOCIOECONOMIC ASPECTS OF THE POPULATION AFFECTED BY LEPROSY IN SOROCABA, BRAZIL

Bakirtzief, Zoica

Pontificia Universidade Catolica de São Paulo, Brazil

The population studied comprised 1288 patients of one Health Unit, including cured ones. Their profile was: mostly males (56%) economically

active age from 15-59 years old (59%), and 39% above 60 years old. Some coming from neighboring towns (21%) where treatment is available. The number of patients treated in 1996 was 629 whereas the epidemiological registry of active cases was about 450 which means that cured patients still come for medical assistance.

A sample was drawn to be studied in relation to non-leprosy affected households. The results indicated that patients were poorer than the general population as a whole being concentrated in classes C, D and E. Also, the characteristics of the head-of-household were similar as far as age, sex and home ownership (the majority owned it).

However, the households were different as far as work situation and schooling. That is, more retired persons in the leprosy affected households than their neighbors, and less than 4 years of school in leprosy affected households, whereas the neighbors had up to 8 years of formal education.

The results are discussed in relation to other publications about socioeconomic situation of leprosy patients in Brazil and suggestions for economic rehabilitation are proposed.

PS05

A HEALTHY VILLAGE PROJECT IN THE UK

Dr Derek Browne FRCGP, FRIPHH, MRCP, DTM&H
Brockenhurst, Hampshire SO42 7SW UK

Healthy villages can support patients with disabilities with or without infective disease. In our rural community of Hampshire New Forest, we have a practice population of 3500 patients, some have chronic disabilities. We appointed a 'healthy village coordinator' who received referrals from the primary health care team. The co-ordinator identified and collated community resources including facilities in the local schools, village and church halls and linked the individual needs with the community resource. Research data showed that the referred individuals had improved well being, with reduced prescribing of medication and reduced referrals to hospitals. Their quality of living had improved.

A healthy village concept supports WHO Health for All, and Healthy City projects. The model is based on the rural health work formerly carried out by Dr Stanley Browne in the former Belgian Congo, and in China by the late Ma Haida. A world without leprosy needs to integrate people with chronic disabilities in their communities. A 'healthy village project' can provide the structure to support health and social care needs for our patients in the next millennium.

PS06

ACTIVITIES FOR ENLIGHTENMENT ON HANSEN DISEASE IN JAPAN

Akitoshi Murakami and Masao Yuhu, National Hansen Institution

Kikuchi-Keihuen, Kumamoto, Japan

The day April 1, 1996 was the greatest breakthrough in Japan for all ex-Hansen patients who had been segregated in Hansen institutions. On this day, Leprosy Protection Law was abolished, and we staff of the institution shared pleasure with the ex-patients. They have lost many significant things by segregation for more than 40 years after the treatment was established, including bonds of hometown, family and community of their own. There were two reasons for happening of such a sad affair in Japan. One is that Leprosy Protection Law was not abolished; instead it was revised to enact in 1953 under strong suggestion by a couple of Hansen specialist physicians at that time. The other is that Japanese leprosy association ignored Roman Declaration by the 6th international leprosy congress in 1957 that isolation against Hansen disease should be abandoned.

In kikuchi-Keihuen, we started activities for enlightenment in 1992 to the general public that had misunderstood that Hansen disease was an awful disease. As a result, many people had right understanding of the disease, which in turn made it possible for ex-patients to regain bonds of local communities and hometown and family. In addition, abolishment of Leprosy Protection Law in 1996 has promoted this event. In Japan, many of married exe-patients do not have their own children because of duty of a contraceptive operation. Therefore, they particularly enjoy heartwarming exchanges with school children.

Our recent experiences show that activities for enlightenment on Hansen disease is very effective to eliminate prejudice and discrimination. We also appeal that we should never repeat historical fault in other diseases such as AIDS.

PS07

ASSESSMENT OF THE FACTORS BEHIND HIGH DEFAULT RATES AMONG LEPROSY PATIENTS IN NEPAL. (analysis ongoing)

M. L. Heynders

Netherlands Leprosy Relief Association, Biratnagar, Nepal.

In the six districts of the Eastern leprosy Control Project in Nepal approx. 40 % of the registered leprosy patients are non compliant to their treatment. This study was conducted to find the main reasons why some of the registered patients do not finish their treatment. Patients were called 'defaulters' when they had missed 12 consecutive months of treatment. Patients were released from treatment, 'RFT's', when they had finished 24 doses of MDT within 36 months. 36 defaulters and 47 RFT's could be traced and interviewed. From all patients in depth interviews were taken at their homes. Topics for discussion were diseases related issues, helpseeking behavior, treatment experience, social impact of the disease, and family support. Reasons for defaulting found were: severe side effects, lack of knowledge about the disease, denial of the disease, feeling of being cured, no hope for cure, quality of care at Hp's, long duration of treatment. Reasons for compliance and becoming RFT were fear of the disease and the impact of treatment. Most of the patients were hiding their disease for the communities. RFT's were more successful in this. Most patients live isolated within the family. The term compliance appeared to be quite narrow, since it was defined as confirmity with 'Western' medicine. People's decision to continue or not with the prescribed treatment is subject to many different forces, e.g. spiritually, cultural concepts of disease, community pressure, experienced quality of care. To improve the compliance to 'Western' medicine the patients do not have to understand the theory underlying biomedicine, but they have to accept it. In this case other motivational factors must be present, like trust in the received care, receiving enough caring and concern. Patient education should include information about the cause of their disease and its relation to its treatment, the duration of treatment, its side effects, and the learning of coping skills. Health workers should be trained in the social aspects of leprosy, and should be better trained in communicating with patients. Also community health education should be conducted with communities and their leaders about causes of leprosy and its curability.

PS08

FOCUS GROUP WORKSHOPS ON LEPROSY AND ITS IMPACT AMONG RURAL COMMUNITIES IN NORTHERN INDIA - A PRELIMINARY STUDY

Jay Palla, P Ramachandra Rao and Daniel Masih

The Leprosy Mission Hospital, Barabanki, Uttar Pradesh, North India.

Persons affected by leprosy (PALs) often suffer from many social disadvantages and even severe degree of social disruption. It is often seen that even with a medical cure and economic assistance, PALs were not easily accepted back in to their communities. This project aims to bring back community and PALS closer in their social network through a scheme of Focus Group Workshops.

Leprosy workers trained as facilitators conducted Focus Group Workshops in leprosy endemic areas among several community groups. A 6 monthly follow up data were collected, analysed and compared with documented baseline data.

Preliminary results indicated that focus group workshops give ample opportunity for interaction among villagers and has significantly raised their awareness, Knowledge and their ability to communicate with PALs . A significant number of participants shared with their families, friends and neighbours

and disseminated the new information they had received. About one third of the participants wish to become facilitators.

It is suggested that community based focus group workshops will have a very significant role in preparing and equipping communities to take care of PALs through elimination to eradication.

PS09

DETERMINANTS OF MDT TREATMENT ABANDONMENT BY LEPROSY PATIENTS IN CITROLÂNDIA

Authors: Maria Beatriz P. Orsini, Gilmar S. Figueiredo, Ilma N. Porto, Maria Aparecida Alves Ferreira, Mônica N.V. Apipe, Ronise C. Lima.

Citrolândia Health Centre, Betim, Brazil

The study presents the analysis of the determinants of MDT treatment abandonment by leprosy patients at the Citrolândia Health Centre, located in a region which developed itself close to a sanatorium. Treatment abandonment has been one of the main obstacles to the elimination of leprosy as a public health problem.

It is a qualitative research carried out through semi-structured interviews with patients who have abandoned treatment and others who are being treated regularly. Its main objective is to know the reasons for compliance or non-compliance to treatment.

After a reviewing the records it was observed that 30% of the 179 pacients in the active registry had abandoned treatment.

These patients were contacted through mail or visits to their households and then interviewed.

Patients claim they have abandoned treatment due specially to their disbelief in a cure, the occurence of reactions and neuritis during treatment and the side effects of the drugs.

The authors have come to the conclusion that the social representations of the disease and its evolution is greatly influenced by leprosy historic and cultural determinants in the region as well as by the difficulty of the service in carrying out educational measures of impact and actions of vigilance to health.

PS10

LESSONS FOR LEPROSY PROGRAMMES FROM SOCIAL MARKETING AND SOCIAL ADVERTISING : USING THEORETICAL FRAMEWORKS TO IMPROVE THE EFFECTIVENESS OF CAMPAIGNS

Penny Grewal[1], Dayamal Dewapura[1], Padmini Gunawardene[2], Sunil Settinayake[2]

[1]Novartis Foundation for Sustainable Development, Switzerland, [2]Anti-Leprosy Campaign, Ministry of Health, Sri Lanka

In view of the inevitable scaling back of resources for leprosy in the post elimination era, it is crucial that the community understands more about leprosy, its signs, symptoms and treatment prospects. This will help create a supportive social environment which encourages persons with suspicious lesions to seek diagnosis and timely treatment. Health care providers will also have to be motivated to learn more about leprosy in order to detect and treat or refer new cases.

The behaviour change required with regard to leprosy is a "high involvement" decision. Such decisions are typically made through a series of stages namely precontemplation, contemplation, action and maintenance (Transtheoretical model; Prochaska and DiClemente, 1983). Stage specific strategies are required to move the target audience to action and maintenance. At the precontemplation stage, for example, the target group does not see the proposed behaviour as relevant to their own needs often due to a lack of awareness or different values. This stage requires strategies based on cognitive models to create an interest in and awareness of leprosy as well as change of values. After precontemplation, behaviour is driven primarily by perceived benefits, perceived costs, perceived social influences and perceived behavioural control. Once the initial action has been taken, behavioural models become more important than cognitive models.

This paper shows how the transtheoretical model has been adapted for leprosy in Sri Lanka and the stage specific methods used (e.g. highly visible mass media campaign at precontemplation / contemplation; entertainment educational methods like TV and radio dramas at contemplation, interactive sessions to trigger action, ensuring quality care to motivate compliance). The paper also discusses the experience acquired from its practical application (e.g. difficulties in ensuring that improved recognition is accompanied by stigma reduction) and the advantages and limitations of the theoretical framework.

PS11

A STUDY OF KNOWLEDGE, ATTITUDE AND PRACTICES (KAP) AMONG LEPROSY PATIENTS IN A LEPROSY CONTROL UNIT.

Manas Kumar Kundu, The Leprosy Mission, Purulia.

This study is aimed to assess the existing level of knowledge about leprosy, attitude towards society and day to day practices needed among the leprosy patients. One Leprosy Control Unit is selected for the study. A pretested questionnaire was administered to 336 leprosy patients in random method. Overall level of knowledge about leprosy is found to be low. However, there are significant differences in knowledge, attitude and practice (KAP) among rural-urban, male-female, educated-uneducated, lower-higher socio economic status group of patients. There are lot of misconceptions in knowledge regarding cause, transmission, treatment and infectivity. Negative attitude towards society which reflects negative attitude of society towards leprosy patients is mainly found among those who are deformed. So far as practices are concerned - 62% of patients are attending the clinic regularly, 35% of the patients with anaesthetic hands & feet are practising self care at home and 25% are using MCR shoes. Level of knowledge about leprosy among the deformed is much lower than those without deformity. Since overall KAP levels were low I conclude that regular Health Education to the patients and community awareness programme should be stressed. Health Education has been incorporated as an integral component of leprosy control programme since long time but unfortunately it has been almost totally neglected so far.

PS12

Almenara project, What Freedom Theology can do for leprosy control?

Luciula Guedes, João Climaco, Frei José Mauro, Eduardo R. de Abreu

In Brazil, Like others counties in latin America catholic church since the 70' years has been involved in social transformation as we can see in the work of "Pastoral da saúde".

The authors relate a ezperience held in vale do Jequitinhonha-MG, Brazil in the last seven years in which health's profissionais share experience with people born the Jequitinhonhas valley and volunteer of health's pastoral.

The authors discuss the importance of aspectes like religious aind cultuial dimensions of life in rural areas with 180.00 citizens in 16 towns in mortheast of Minas Gerais state

PS13

Leprosy Stigma:

The Phenomenon and its relation with " exclusion locus" and heighbourhood.

Eduardo R. de Abreu

Fundação Hospitalar de Estado de Minas Gerais

In a Field Study established since 1984 and repeated in 1989 and 1998 the author pretend to describe the cultural changes and transformation of the valves relative

to leprosy patients in two towns not for from Sanatório Santa Izabel, a colory Hospital with aproximately 850 patients.
This paper describe relation ship between citizen from these theree communityes in the last fifteen years.

PS14

THE LEPROSY PATIENTS ATTITUDE TOWARDS THEIR CHRONIC AND RECURRING ULCERS:- A STUDY REPORT

V. Kathe and S.S. Naik
Acworth Leprosy Hospital Society for Research, Rehabilitation and Education in Leprosy, Wadala, Mumbai-400 031, India.

A study was launched to understand what the leprosy patients think about reasons behind their chronic and recurring ulcers and their attitude towards these deformities. Ninety such leprosy patients attending leprosy centre and residing in leprosy colonies were interviewed. Out of them 41 were males and 49 were females in age group of 30 to 45 years. The most of them illitrate (26%) or having primary education (65%) and the profession as begging (23%) and unemployed (40%). 95% of them were suffering from plantar ulcers.

The reasons for recurring ulcers were given by them as due to loss of sensation (40%), injuries from stones, nails and glasses, (31%),blister formation due to "chapples" or corns (21%), the bites of rats (7%). 37% of them agreed that because of ulcers, their life was disturbed and they are ashemed to move freely in the Society (69%). All of them know the medical treatment of ulcers and care of hands and feet. But becuase of severe apthy and frustration they neglected that part and managing only with bandages and oinments. They accepted these wounds are going to be their life component. It is suggested that 50% of them who are earning their livehood can be persuaded through their immediate family members and relatives to take care of their ulcers with sucessful results. Studies on those lines are needed.

PS15

LEPROSY: A GRASSROOTS PERSPECTIVE

Jose Ramirez, Jr., MSW and Magdalena S. Ramirez, MSW

R & S Social Work Consultants, 3810 Drummond, Houston, Texas, 77025 USA

Persons with leprosy are routinely perceived by many as communicable, unhealthy, unworthy, sinful and unable to be contributing members of society. These erroneous stereotypes can easily become a self-fulfilling prophecy, denying those of us impacted by this rare illness the simple opportunity to succeed.

Historically, as ignorance about leprosy escalated, so did funds allocated to isolate and label millions of persons affected by this bacillus. This can best be illustrated on a bell shaped curve.

Conversely, as more and more individuals were placed in segregated settings, the less they were involved in exercising basic civil rights and the more likely they were to be denied opportunities to make choices on how and where to live. This can be illustrated by an inverted bell shaped curve.

As funding now decreases in response to the prospect of "elimination", the Culture of Leprosy is in dire need of a supportive emotional environment. Opportunities for choice, dignity and respect continue to remain flat. Unless this support becomes international policy, persons diagnosed with leprosy in the future will likely live in fear of being "discovered". The pendulum will swing back to the side of exclusion, decapitating all efforts to live like other persons, without disabilities.

PS16

TRANSFORMING THE IMAGE OF LEPROSY: SOCIETY NEEDS A NEW METAPHOR

Anwei Skinsnes Law, MPH

International Association for Integration, Dignity and Economic Advancement (IDEA), P. O. Box 133 Oak Hill, WV 25901 USA

Despite tremendous medical advances, "leprosy" remains the metaphor for the worst that can befall a human being. What are the reasons for this and what are the steps that must be taken to transform the traditional image of despair into a positive image of hope and triumph?

In looking for answers to these questions, it is important to look at the image of leprosy which is presented to the community. When we show the miraculous effects of MDT, do we only show cleared skin lesions or do we show someone who has been given back their future? Do we send a dual message to the public when we say people are cured but then continue to call them "patients".

Positive images of complete human beings are not just for people interested in social issues. They are essential to the effective treatment and control of leprosy and to the elimination of the disease, which includes the elimination of social exclusion, prejudice and discrimination. If society is to change its image of leprosy, it must see individuals with names and personalities who are living full and productive lives, and happened to once have a curable disease called leprosy.

PS17

LEPROSY IN THE UNITED STATES: A CASE STUDY OF A LOW ENDEMIC COUNTRY

Judith Justice

Institute for Health Policy Studies, School of Medicine, University of California at San Francisco, USA

This first comprehensive study of leprosy in the United States provides a case example of a low endemic country. The research assesses the situation of patients who are primarily from immigrant, ethnic and minority groups, and identifies factors influencing recognition of symptoms, availability and access to care, compliance to treatment, and long-term follow-up care. The research also focuses on the variation in services available to these patients, including the Public Health Service Hospital, Government funded regional out-patients centers, and private clinics and physicians, in addition to how training, knowledge and experience of health care providers in a low endemic country influences diagnosis, referral, treatment and rehabilitation. Changes currently taking place in U.S. health care and the impact of health, welfare and immigration reform upon this vulnerable patient population are documented. One objective of the study is to assess culturally sensitive research methods to determine those most appropriate for conducting research on leprosy patients in situations similar to the United States. This study therefore provides a model for studying leprosy in low endemic countries. The research findings and recommendations will be useful for other countries with declining patient populations.

PS18

THOSE DISABLED BY LEPROSY DEMAND DIGNITY AND FULL PARTICIPATION

Areqa Kassa Zelelew
Ethiopian National Leprosy Disabled Association
P.O.Box 24530, Addis Ababa, Ethiopia

According to WHO, the term "*Disabled Person*" means any person unable to ensure by himself, wholly or partly, the

necessities of a normal individual and/or social life, as a result of a deficiency, either congenital or not, in his/her physical or mental capabilities.

Disability may be the result of biological factors affecting the individual before birth or the result of natural or manmade causes of damage. Among these factors leprosy is one of the leading cause of disability in the world. The disability caused by leprosy affects the individual's social life more than his physical capacity, because of stigma. I will consider the following points in order to understand the facts.

1. The concept of the causes of disability in our society.
2. The problems faced by those disabled by leprosy as compared to those disabled by other causes.
3. The need for special consideration of persons disabled by leprosy.

In conclusion, The Ethiopian National Leprosy Disabled Association (ENLDA), which was established with the objective of solving the complicated problems facing its members as stated above, has used all available opportunities to spread such knowledge in order to change attitudes in society towards leprosy disabled persons.

The education of the public by leprosy workers is challenging and must be kept up. Lastly I want to stress again that the leprosy disabled person wishes to enjoy dignity and recognition in society.

PS19

IDEA AFRICA: THE CENSUS & THE TAKE OFF

Ekekezie, Uche 'M

IDEA, Regional Office for Africa, #48, Toyin Street Opp. Water Parks, Ikeja, Lagos, Nigeria

This paper is about people, about an urgent human situation, and about human response to that situation. In the next two years, WHO will declare HD "eliminated". In the meantime, as IDEA slowly but surely becomes established all over the world, IDEA Africa, though still in the process of setting up her Regional Office, has already gotten down to serious business, building up a veritable network across the continent, sponsoring and encouraging direct PAL participation in important international events, creating some pilot projects and making their enabling presence felt here and there. Nigeria leads in this effort and the pioneer members of IDEA Africa are pursuing the programs and targets they had set for themselves with a sense of commitment and with all seriousness.

The main objectives of this paper are to: 1) take a cursory look at the HD situation presently in Africa, from the point of view of African PALs and other IDEA Africa Members, and put the finding side by side with the implications of the imminent WHO elimination target; 2) express the opinion of PALs on elimination by the year 2000; 3) estimate how many people need IDEA intervention in Africa: 4) examine effect of some rehabilitation strategies and methods used by some older organizations who have been in the business of rehabilitating PALs long before IDEA was born.

(This investigation was sponsored by members of IDEA Africa, with logistial support from the TLMI, GLRA and the Federal Government of Nigeria.)

PS20

SOCIAL ACCEPTANCE OF CHILDREN OF PEOPLE AFFECTED WITH LEPROSY.

Mary J. Paul

The Leprosy Mission , P.O. Box 9, Purulia 723 101, West Bengal, India.

A Psycho-social study was conducted on 150 Leprosy affected families and their children and 200 members of the general public to assess the social acceptance of children of leprosy affected people. Special focus was given on education, occupation, and marriages. The results show that the children of leprosy affected families are well accepted into schools/colleges, also they do not face much discrimination by the general public in getting employment or at the place of work.

However, in the marriage context social stigmatisation of leprosy affected families is still significant. In addition many leprosy affected families expressed rejection without being able to cite specific experiences. The study shows that there is lack of awareness of leprosy among the general public especially among socio-economic disadvantaged people. Designated schools for families of leprosy patients tend to demotivate the leprosy affected families from attempting to integrate their children into general schools. This calls for counselling of leprosy affected families.There is also a need for intensive health education to members of the general public with special focus on those of low socio-economic status and those who hold to orthodox or conservative traditions which tend to potentiate the rejection of leprosy affected people.

PS21

SOCIAL STIGMA STATUS OF PALS IN THE PROJECT AREA COMMUNITY- PRELIMINARY FINDINGS-

T.J. Baskaran Richard, Dilip Christian, Eben Baskaran and Rupert Samuel.

Dayapuram Leprosy Control Project, Manamadurai, Tamil Nadu, South India.

The present scenario of Leprosy with decline of prevalence and deformity among new patients and higher percentage of MDT Coverage with priority for Community awareness, the social changes that has taken place in the community towards the leprosy patients has taken an important preposition.

So a study has been conducted at The Leprosy Mission Hospital, Dayapuram, Manamadurai to find out the General Stigma attached to Leprosy patients especially with deformity together with their knowledge on disease and control programme benefits.

The study population includes patients currently under treatment and OPD Programme, their households, immediate neighbourhood and a community sample, a Community Leader and a Village functionary. Structured questionnaire was designed separately for each category of respondents and was conversed by trained Leprosy workers.

Preliminary analysis suggests that there is a decrease in the level of social stigma. It also reveals the need for continued awareness Programme. The full analysis of the data is being done.

There are measures to eliminate Leprosy and other economic upliftment measures like providing sarees/ dhoties, bed sheets, Bank loans and other financial assistance. This study is designed to measure the status of Social Stigma.

PS22

PSYCHOLOGICAL IMPACT OF STIGMA IN THE ABSENCE OF SOCIAL STIGMATIZATION

Nimal Kasturiaratchi[1], Mitchell Weiss[2], Penny Grewal[3], Padmini Gunawardene[4], Dayamal Dewapura[3], Sunil Settinayake[4], Lakshmi Somatunga[4], Vinya Ariyaratne[5]

[1]University of Peredeniya, Sri Lanka, [2]Swiss Tropical Institute, Switzerland, [3]Novartis Foundation for Sustainable Development, Switzerland, [4]Anti-Leprosy Campaign, Sri Lanka, [5]University Sri Jaywardenepura, Sri Lanka

Leprosy is a stigmatised disease in many societies with serious implications for the management of leprosy programmes. With the wide scale use of MDT in leprosy endemic countries, people have seen positive prognostic features which have led to a significant reduction in fear of the disease and stigma. This collective illness experience is lacking in low endemic countries where stigma may operate differently.

To ascertain how stigma affects help seeking behaviour and the overall illness experience in Sri Lanka, 160 patients were selected at random from three categories of patients on treatment: those detected without deformities,

with numbness and with grade 2 deformities. Semi-structured interviews were carried out to obtain narrative accounts of illness experience including patterns of distress, personal experience with stigma, names for the disease, help seeking behaviour and experience with treatment.

The study revealed how patients suffered from their own stigmatising ideas about this illness, rather than social castigation. Their suffering arose from concern about their diagnoses characterised by their internalisation of the cultural syndrome, stress of having their diagnoses known to others resulting in possible social isolation. The distress due to the local term used to denote leprosy is very significant. In addition, financial concerns due to the physical effects of leprosy such numbness or deformities were mentioned as well as symptoms pointing to transient psychological conditions.

The findings indicate that these individually internalised experiences need more attention than the social attitudes towards this disease. To assure quality of care, health care providers who treat these patients must be trained in counselling techniques, psychiatric referral and disability care so that they are aware of the psychological impact of culturally internalised stigma, even in the absence of overt social stigmatization.

PS23

PERSONS AFFECTED BY HANSEN'S DISEASE:
WITH A CHALLENGE . . . WITH A MISSION

Ernesto G. Cabanos, Jr.

Department of Health, Eversley Childs Sanitarium
Mandaue City, Philippines

Elimination will remain a dream in the hearts and minds of persons affected by HD if integration is not realized, respect and dignity are not restored, and equal rights and privileges are not enjoyed. It is time to consider ourselves equal partners in the delivery of basic information and knowledge.

Our testimonies and success stories are the best educational tools. We can encourage others to seek early treatment, teach prevention of disabilities, assit in early diagnosis and referral, and be a support group. Our physical disabilities can be memories of the past. HD can be just one chapter in our lives.

In the Philippines, we have developed a program whereby facts about HD, testimonies, experiences and success stories are presented in musical and narrative form. Values, culture and lifestyle are portrayed, dramatized and spoken in local dialects. Target audiences are college and university students; areas/ communities with high HD prevalence rates; areas/ cummunities with strong social rejection; and companies/ institutions which don't accepted persons affected by HD in the workforce.

We can make a big difference in the hearts and minds of the public. This is a challenge . . . a mission . . . that needs the involvement of each individual affected by HD.

PS24

WHETHER RFT STRATEGY IN MDT LEADS TO MORE AMPUTATIONS IN LEPROSY PATIENTS - A 20 YEAR STUDY

Dr. V. Durai, & Dr. P.K. Oommen
Central Leprosy Teaching & Research Institute, Chengalpattu

The introduction of fixed duration of treatment envisages RFT after 6 doses in 9 months and 24 doses in 36 months for PB cases and MB cases respectively. This strategy has resulted in loss of regular contacts between medical team and the residual cases with insensitive hands and feet. This was in contrast to the mono drug treatment period, where patients had regular contacts with medical team. The residual problems such as management of ulcer, care of anesthetic feet & hand requires the attention of medical team even after completion of MDT for prevention of deformity.

In this study, patients admitted in Central Leprosy Teaching and Research Institute from 1976 to 1995 was used for analysis. A total number of 293 amputations, below-knee level, symes and mid-foot amputations were done. The amputations performed before 1986 considered as mono era patients and after that considered as MDT era. The criterion for selection of patients for amputations and the surgical team philosophy on management over the last two decades has remained unchanged.

Various factors that lead to amputations were discussed in detail. This study reveals that RFT strategy in MDT has not resulted in decreasing the risk of mutilating surgeries. It is suggested that a working system of POD and also to have **follow up of all the high risk patients with insensitive hands & feet, atleast once in a month.**

PS25

PROGRESS OR ABANDONMENT?

Les Parker

St. Giles Home, Moor Hall Lane, East Hanningfield,
Essex, CM3 8AR England

With so much uncertainy about the future of Hansen's Disease centers throughout the world, the experience of St. Giles, the last HD Hospital in England, and its five remaining residents is an important example of how progress can lead to a feeling of abandonment.

In the mid-eighties, St. Giles ceased to be a hospital and was taken over by a housing association. Over time, we were joined by 25 individuals, most of whom have mental disabilities. I sympathize with them, as they have to be housed somewhere due to similar closure of their own centers, but I question whether this population was the best suited to join us at St. Giles. In addition, our care has decreased from 24-hour, 7-day-a-week specialized medical care to one part-time nurse. The atmosphere is nothing like it was when we all had the same problems and understood each other. In many ways, I feel more isolated and alone than ever.

Hansen's Disease centers have been homes to thousands. As our numbers decrease, decisions about mixed-use for these centers cannot be made simply on financial grounds. Psychological, medical and social factors must be taken into consideration and discussed with those whose lives will be impacted by the decisions. It is essential that abandoned buildings don't result in abandoned lives, no matter how small our numbers may be.

PS26

STEPPING OUT OF THE DARKNESS:
A NARRATIVE AND SLIDE PRESENTATION

Bernard K. Punikai'a

President for International Advocacy, International Association for Integration, Dignity & Economic Advancement (IDEA), 1541 Kalakaua Ave., #802
Honolulu, Hawaii, 96826 USA

Twenty years ago I was denied service in a restaurant because I had Hansen's Disease. Fifteen years ago I was arrested for attempting to have a voice in decisions concerning my future. Ten years ago I was appointed to the Hawaii Board of Health. Two years ago I spoke at the dedication of a housing complex for senior citizens and persons with dis-abilities. Last year I spoke at the United Nations.

The process that led to these changes provides practical solutions for eliminating society's fear and resulting prejudice against people with HD.

When injustices accumulate over a long period of time, the human spirit can no longer accept such conditions, and three things occur: 1) Individuals realize that they have to assert themselves and speak out publicly in order to be seen as people, not a disease; 2) They realize that one cannot fight

discrimination alone so network with others who have had HD; and 3) Reach out to caring people in the community to become partners in overcoming restrictive policies, archaic attitudes and discriminatory actions.

Ultimately, this process shows the community that those of us with HD are many things, but there is one thing we are not - we are not "lepers".

PS27

HOW WILL WE REMEMBER PEOPLE WHO LIVED WITH LEPROSY?

Valerie Monson

The Maui News, Wailuku, Hawaii USA

While documenting the history of leprosy around the world, many dramatic and inspiring accounts have been written or told. Too often, however, the stories come from religious leaders, doctors or social workers and forget to include the words of the people who actually were affected by the disease and had to overcome an ignorant society to live productive lives.

If you visit the original (and now abandoned) Kalawao settlement on the Kalaupapa peninsula, you will hear detailed descriptions about Father Damien, Mother Marianne, Robert Louis Stevenson, even the wife of a pharmacist who kept a diary, but you won't hear a single memory of the thousands of people from Hawaii who were taken from their families and sent there with the disease. We will never know who these people were. Even their gravestones, most of them washed away or crumbled to bits, are gone.

Fortunately, such an incomplete history will not be repeated at modern-day Kalaupapa where people who had the disease have been encouraged to share their stories in books, newspaper articles and video interviews. As a result, these remarkable individuals will be remembered not simply as "patients," but as human beings with full lives. With these stories, a much more accurate account of life in Kalaupapa -- its tribulations and its triumphs -- has emerged.

These first-hand memories are not only necessary to tell the true history of leprosy and how it affected people, but to hearten others who have been recently diagnosed and fear their lives are over.

As a reporter for The Maui News, I have written more than 50 articles about Kalaupapa's people, focusing on life after the disease. I would like to share this message so others around the world will do the same.

PS28

MANY FACES OF STIGMA: COMPARISON OF METHODOLOGIES.

Nimal Kasturiaratchi[1], Mitchell Weiss[2], Penny Grewal[3], Padmini Gunawardene[4], Dayamal Dewapura[1], Sunil Settinayake[4], Lakshmi Somatunga[4], Vinya Ariyaratne[5]

[1]University of Peredeniya, Sri Lanka, [2]Swiss Tropical Institute, Switzerland, [3]Novartis Foundation for Sustainable Development, Switzerland, [4]Anti-Leprosy Campaign, Sri Lanka, [5]University Sri Jaywardenepura, Sri Lanka

Although, Leprosy is considered a stigmatising disease the exact nature of stigma is difficult to be studied. Leprosy workers consider stigma as given and attempts to repeal it by educating patients and general public to view it as an "ordinary" illness. This exercise becomes futile when the complex nature of stigma is not understood fully and when its subtle ways of manifesting are not recognised.

This paper presents how stigma manifests itself when three methodologies were adopted to determine it. The methods referred to are: ethnography, empirical questionnaire and analyses of qualitative narrative statements made by respondents made as answers to quantitative questions.

These studies, conducted in Sri Lanka, suggests that ethnograhic studies reveal the overall cultural themes of stigma which can be best utilised in health education programmes. The quantitative (empirical) studies on the other hand enabled the understanding of the comparative perspectives of stigma among different types of respondents including the sufferers themselves. The analyses of narratives indicated the subtle mechanisms of internalisation of stigma indicating how psychiatric, social and cultural manifestations could occur.

Social marketing, patients care, and involvement of health care providers within the antileprosy programmes warrant different types of information. The Sri Lankan experience may assist leprosy workers in other countries to select an appropriate methodology to study stigma depending on the needs.

PS29

REHABILITATION THROUGH PARTNERSHIPS

Siegfried Beecken

Partnership for Rehabilitation, P.O. Box 28, Pokhara, Nepal

Usually people affected by leprosy spend most of their lifetime with their family and in their communities. However, there has been a tendency - especially in areas where there is a lot of stigma attached to leprosy - to 'draw out' leprosy sufferers from their communities into leprosy institutions. Initially, this assistance provides great benefit. However, on a longer term basis, such institutions can result in both the loss of the natural community support and the creation of high expectations on the side of the leprosy-affected clients, for social and economic security. Thus the clients can become very dependent. In the past help has often been provided from a specialist to a 'leprosy patient' - rather top down. Now is the time to recognise people affected by leprosy as equal partners. It is time to discover communities as partners in our efforts to facilitate help for our clients. As we move towards the eradication of leprosy, it is time to develop sound strategies for rehabilitation, based on such partnerships.

We have to start to go to the homes of our clients, to meet their families and communities in order to be able to understand their situation and to help them to live an independent life with dignity. In addition, it is our responsibility to motivate, equip and enable communities to assist their people affected by leprosy. Treatment of leprosy has been integrated into the general health system. We must now work through an integrated approach in facilitating rehabilitation. Community-based rehabilitation approaches have the great potential to work in real partnership with people with disabilities, including those affected by leprosy and their communities.

PS30

LEPROSY VILLAGES IN THE CENTRAL HIGHLAND, VIETNAM

Vo Tri Toan, Kirsten Løvdal Bjune and Gunnar Bjune
Centre for International Health, University of Bergen,
N-5021 Bergen, Norway

The Central Highland has Vietnam's highest prevalence of leprosy. The health infra structure is weak, population scattered and consists of more than 50% minority populations with more than ten different languages and cultures. The National Leprosy Eradication Programme is implementing the Special Area Programme for Elimination of Leprosy (SAPEL) and Leprosy Elimination Campaign (LEC) strategies to reach the highland population.

Gia Rai and Banah are the two largest ethnic minorities in Gia Lai Province. Remoteness of the villages makes health and educational services practically non-accessible. Traditionally they practised slash and burn agriculture and supplement their meagre resources by hunting and gathering in the surrounding forest hills. The villages have to move every three to four years when the soil is exhausted. A fixed pattern of movement brings the village back to its first location at fifty years cycles. However, environmental deterioration during the war, immigration of farmers from the lowlands and increase in the indigenous population have made this life style non-sustainable. Socio-economic conditions in leprosy villages are appalling. The Government of Vietnam attempts to improve the conditions through a special programme for Elimination of Starvation and Alleviation of Poverty Programme (ESAP).

For at least 100 years Gia Rai and Banah have segregated leprosy families in special villages where most of the adults have major leprosy deformities and disabilities and have to rely upon their children and neighbouring villages for food supplies. The segregation pattern is unique in the sense that the patients have usually lived for a long time well integrated in their village of birth until all families with leprosy in the village split off and establish a new village much the same way as villages which have grown too large split into two. There are no obvious psychological hostility towards the leprosy village, and communication between this and the mother village seems to be free. The traditional organisation of the leprosy village is the same as in the culture as such (matriarchal extended families) with one significant difference; their settlement is permanent and thus more fit for sustainable development.

We will present an explorative medical anthropological study done with the aim of developing the 37 leprosy villages widely dispersed in the province to nuclei for improved living conditions and sustainable development for the ethnic minorities as a whole. Data were provided by the local health services and provincial authorities and supplemented with participatory observations in a few representative leprosy villages.

PS31

AN UNUSUAL EXPERIENCE

Sheng-fu Chen
Yihuang County Station for Skin Diseases Control, Yihuang County, Jiangxi Province, China

This is a special report given by a doctor having a good and perfect family

One year after being enrolled at the Jiangxi Medical College in 1972, he unfortunately was diagnosed as leprosy. Because of the long established stigma in the society towards leprosy, he discontinued his study and was accepted in a leprosy village for isolated treatment.

Since then, he did not give himself up as hopeless but put up a tenacious fight against the illness, and served patients warmheartedly inside and outside the village with his knowledge. His selfless service has benefited the health of a great number of people including saving an youth's life from freezing river. His untiring efforts and contributions to leprosy control and general health care for more than 20 years made him trusted by related authorities. He has succeeded in physical and social rehabilitation both.

PS32

COMMUNITY ACTION PROGRAMME FOR SOCIAL CURE OF LEPROSY (CAPSULE)

C.S. Chenyan, T. Jayaraj Devadas, Dr. Thomas Abraham
GLRAVALES-INDIA, #4,Gajapathy Street,Shenoy Nagar,Chennai 600030.

Leprosy is a unique social disease. A social disease needs a social cure. Any patient affected by any disease other than leprosy ceases to be a patient once he is cured of the disease. But in the case of leprosy it is not to be so. Even after cure one has to carry the tag of Social stigma. This situation warrants the need for ushering in a Social Cure for leprosy patients.

Social cure of leprosy is acceptance of a person cured of leprosy by the contemporary society and allowing him to function as a normal individual socially, without discrimination, let or hindrance, on all walks of life. Capsule is a set of community action programme envisaged to prepare a congenial atmosphere to bring about a Social Cure for leprosy patients.

No programme, however good that be, can bring lasting changes in the beliefs and attitudes of the people unless that doesn't become the peoples programme. The following Special groups are formed and sustained in the community.

- Community Action Groups
- Advocacy Groups
- Friends of Leprosy affected Groups
- Participating the patients directly in disability limiting exercises

The above given special programmes initiated will help accelerate the reintegration of the leprosy cured persons into the society which ultimately is the Social Cure for leprosy.

PS33

KNOWLEDGE, ATTITUDE AND PRACTICE ABOUT LEPROSY AND TB IN NORTHERN BANGLADESH

Richard Croft, Rosemary Croft

Danish Bangladesh Leprosy Misson, Nilphamari, Bangladesh

A small survey was carried out in northern Bangladesh to assess and compare the level of knowledge, attitudes and practice towards leprosy and TB among two areas that differed widely in the amount of health education received about these diseases.

The results indicate that without a health education programme, levels of knowledge about the cause and treatability of the diseases are poor. Only 16% of respondents in the 'uninformed' area mentioned 'skin patch' in a question about what they knew about leprosy; and 44% mentioned 'cough' as a symptom of TB. In the area that had received health education, 90% mentioned respectively 'skin patch' and 'cough'. 78% of the respondents would not buy goods from a shopkeeper known to have leprosy, 76% if he had TB in the unreached area, but in the community who had received health education the proportions were reversed with three quarters agreeing to purchase from a diseased shopkeeper.

There are low levels of knowledge about leprosy and TB, and unfavourable attitudes in a community that has not received health education. However, knowledge levels were much higher and attitudes more positive in an area that had received a health education programme.

PS34

Bacurau and his Fellows on Their Way: Fighting Against Leprosy Prejudice

Eni caraja, Eduardo R. de Abreu, Helio Dutra Morhan - Nucleo de Betim-MG

The authors present fhotos, interwiews, friends and relatives testimony of a brave man who fhought since childhood until his death against prejudice in favour of people affected by leprosy, promoting dignity for all.

PS35

ECONOMIC SELF SUFFICIENCY AND SOCIAL INTEGRATION OF DISPLACED LEPROSY AFFECTED PERSONS THROUGH MICRO ENTERPRISES.

T. Jayaraj Devadas, G.R. Srinivasan
GLRAVALES-INDIA, #4, Gajapathy Street, Shenoy Nagar, Chennai 600030.

Persons affected by leprosy in addition to the need to adjust to physical disability may find themselves segregated and displaced in the community. Thus it is important to emphasise the process of normalisation by providing them the opportunities to enhance their economic and social status.

A Domicillary Rehabilitation Scheme launched by the German Leprosy Relief Association Fund in 1974 has experimented the promotion of micro enterprises by providing the persons, interest free loans.

A study covering 50 beneficiaries revealed that 83% of them have attained enhanced income and self sufficiency through the different enterprises which they could start out of the loans extended by the scheme. The study also revealed that 66% of the respondents have found that their purchasing power has increased by 30% and they can lead an independent life.

* This study revealed that by developing a sound strategy of loans to promote micro enterprises for self employment and monitor the scheme through counselling and followup by trained and comitted staff the social integration of displaced leprosy affected persons can be done on a wide scale.

PS36

FACTORS THAT AFFECT LEPROSY PATIENT'S DECISION TO DISCLOSE HIS ILLNESS TO OTHERS

Edgardo M. Gonzaga, M.D., Troy Agnedo Gepte IV, M.D., Socorro P. Lupisan, M.D., Felicita M. Medalla, M.D.

Department of Epidemiology and Biostatistics, Research Institute For Tropical Medicine, Alabang, Muntinlupa City, Philippines

A study was conducted among leprosy patients seen at the Leprosy Section of the Research Institute For Tropical Medicine to determine the factors that affect leprosy patient's decision to disclose his illness to others (based on Triandi's Theory).

Qualitative methods such as Key Informant Interview and Focus Group Discussion (FGD) were utilized in the construction of the questionnaires. One of the authors served as the key informant based on his experience with leprosy. The interview was informal. Based on the outcome of the interview, a field guide consisting of open ended questions was prepared for the intended FGD. The FGD was done to elicit opinions and answers to questions regarding the topic. A group of eight (8) leprosy patients were gathered together in one rooms at the unit. Questionnaires were designed and scaled based on the outcome of the FGD and were pre- tested. Scaling utilized adjectival responses with corresponding discrete numerical equivalents. All fifty (50) respondents were instructed to choose a number from one to five, of which 1 would indicate a response closest to the selection on the left side, 5 would indicate response closest to that on the right side. A selection of 3 indicate a neutral response.

Data were entered using the EPI- INFO software. STATA software was used in the analysis. To maximize realibity and validity of items in each subscale, item analysis was performed for all items in the questionnaire using the following methods: 1) descriptive analysis; 2) inter- item analysis; 3) item total analysis; 4) internal consistency coefficient (Cronbach's alpha); and factor analysis. Methods 1 to 4 were essential in deleting or retaining items in each subscale. Method 5 was utilized to confirm decision.

Eighteen (18) items were found to be valid for scaling, of which two each pertains to social factors, affect, values, motivating factors and habit, while 8 items belong to facilitating factors. More items would have to be developed and pre- tested for scaling to satify the requirement of at least 5 items per factor using the Triandi's Model. Questionnaire construction, as shown in some modules would involve a series of activities and pre- testing before a final draft is assessed as suitable for data collection.

PS37

HANDICAP AND QUALITY OF LIFE OF LEPROSY PATIENTS

Ruth Leekassa, Elisabeth Bizuneh, Paul Saunderson

ALERT, P.O.Box 165, Addis Ababa, Ethiopia

Objective: To assess the quality of life (QOL) of leprosy patients, in relation to their impairment grade (EHF score) and to compare them with other dermatology patients.

Subjects: 60 leprosy patients with varying degrees of impairment, who attended ALERT Hospital, were included. 24 patients attending the acne clinic were included for comparison.

Instrument: The WHOQOL-BREF questionnaire was developed by WHO to assess quality of life. It has been validated in many different cultural settings, and for different disease states. The 26 questions are divided into four domains (physical health, psychological health, social relationships and environment). This instrument therefore addresses the measurement of "handicap" according to the International classification of Impairments, Disabilities and Handicaps (WHO, 1980).

Results: There was a highly significant decrease in QOL in all domains for leprosy patients, compared with acne patients. There was a strong inverse correlation between EHF score and QOL in leprosy patients, for each domain. Female leprosy patients had significantly lower scores than male patients in two domains, psychological health and social relationships.

Conclusion: Leprosy patients have a low QOL when compared with acne patients and this is directly related to their EHF score. The poster describes the use of the WHOQOL-BREF questionnaire.

PS38

THE DEGREES OF DEPRESSION IN LEPROSY PATIENTS

Turkan Saylan, Reyhan Mulayim, Mucella Soydan

Istanbul Leprosy Hospital, Bakirkoy, 34747, Istanbul, Turkey

The aim of this study is to investigate the degree of depression in leprosy patients.

This study was done with the leprosy patients (25 male, 25 female) and non leprosy persons (25 male, 25 female). Both groups had equal social characteristics.

Porteus or Alexander IQ test annd Beck and Hamilton depression scale was used for analysis.

In 38 leprosy patients (76.0%) have depression in moderate and severe degree. This ratio was 34.0% (n=17) in control group; 80.0% (n=20) in female leprosy cases; and 36.0% (n=9) in control females.

These results indicate that depression may create more problems for leprosy patients.

Depression may result of the medical and social problems of leprosy patients and worsen to solve of their problems.

PS39

LEPROSY PATIENTS AS CHILD OR ADULT WOMAN-THEIR INTERRELATIONSHIP WITH FAMILY COUNTER PART

S. Joshi, P. Kathe and S.S. Naik
Acworth Leprosy Hospital Society for Research, Rehabilitation and Education in Leprosy, Wadala, Mumbai-400 031, India.

Seventy five children and 96 adult leprosy patients attending leprosy clinic in Mumbai were interviewed with their family members especially children of leprosy patients and income generating parents of child leprosy patients. It was observed that after initial disturbance at the time of diagnosis, the healthy family members had shown acceptance and positive behaviour towards leprosy patients in due course of time (75%), probably due to rapid clinical regression due to MDT and proper health education in Society. However the healthy parents showed some reservation (40%) but children at large showed positive attitude in acceptance of disease.

Seventy women leprosy patients registered during last five years were interviewed for their status and acceptance in families and compared with old leprosy women patients residing in leprosy colonies. It was observed that there was a dast ict change in positive acceptance of family members towards women leprosy patients in recent period due to early detection and effective MDT treatment.

PS40

A STUDY ON BEGGING BY EX - LEPROSY PATIENTS ATTITUDE & WILLINGNESS TO REFRAIN

K.D.V. Prasad, B.P.Ravikumar, V.Paul Jeyaraj and K. Durga Raju

Vocational Training Centre, Vizianagaram, Andhra Pradesh, South India.

A study was undertaken on ex-leprosy patients living in three colonies in and around Vizianagaram town, to explore their attitude to begging and willingness to be rehabilitated.

This was cross sectional study on 160 inmates. A Pre-tested Open Ended Interview Schedule was administered by our professionally trained social worker.

THE RESULTS

1. 77.8% of the beggars operate in Urban area.
2. 82.2% of the beggars are married.
3. The average daily income per day is Rs.20/- per person.
4. 64.3% of the beggars are provided with Rehab Units and all failed; so they continue begging.
5. 94% of the beggars are not willing to give-up begging.
6. The colonies studied are well organised and have registered societies.
7. 70% of these beggars receive Rs. 75/- per month from government towards pension.

PS41

STUDY OF PSYCHO SOCIAL ASPECTS OF DEFORMED AND NON DEFORMED HANSENS PATIENTS - CROSS SECTIONAL COMPARATIVE STUDY

Ratna Philip

Philadelphia leprosy Hospital : Salur - 535 591, South India

Available 30 deformed Hansens patients were taken from hospital and 30, Grade I deformed Hansens patients matched for the age & sex were chosen randomly from the list of the control area patients of Philadelphia Leprosy Hospital, Salur. A pre tested structured interview schedule was administered by the investigator . Results have been analysed using statistical methods for significance.

Analysis of the results demonstrated a significant difference among deformed and non deformed Hansens patients in the following area.

1. Decision making power : (X^2_{01} 8.17)
2. Eating together with family members: (X^2_{01} 7.2)
3. Sleeping along with the family members: (X^2_{05} 4.34)
4. Change in the job after developing disease in both groups of patients: (X^2_{05} 4.59)
5. 33.34% among deformed felt like committing suicide after developing deformity and 23.34% are worried about their future.

This study demonstrates how deformity effects the psycho social aspects of Hansens patients.

PS42

PSYCHOSOCIAL ASSESSMENT AND COUNSELLING

Maryann Richard, Samjhana Gurung, and Ruth Pariyar

Counselling Department, Green Pastures Hospital, Pokhara, Nepal

Counselling Services at Green Pastures Hospital (GPH), Pokhara, Nepal began in October 1993. A Nepali nurse and I, an Expatriate Counselling Psychologist, have worked together to understand and respond to the counselling needs of the GPH in-patients. Our goal was to help reduce the negative effects of leprosy stigmatization through assessment of those in need and then follow-up individual counselling. We began to see referrals from the doctors and our own selection focusing on those who were somewhat confused, not interacting much with others, anxious, depressed and on rare occasions psychotic. A Psychosocial Assessment form was designed to address the person's Psychological and Socio-Economic needs. Using this form as a starting point we assessed each in-patient at GPH (and some selected out-patients) and then chose which persons needed individual counselling. Typically, we met with each person needing counselling for 30 - 45 minutes weekly. Those with depression or psychosis would be met almost daily, but little real counselling is done until they are stabilized on medication. Assessments and counselling follow-up have helped us to focus our efforts on those needing psychosocial help. We then in conjunction with other departments at GPH meet in a rehabilitation team to discuss with the person their concerns and needs looking at strategies for meeting the person's needs. Patients feel listened to and understood. They also feel more able to meet the difficulties they face in their home environments after counselling. As there are no basic listening courses available in Nepal, we began to teach Psychosocial Listening Courses to nurses in N.G.O.s so that they would be better equipped to wholistically care for persons affected with leprosy.

PS43

GROUP COUNSELLING FOR STIGMA REDUCTION

Maryann Richard and Samjhana Gurung

Counselling Department, Green Pastures Hospital, Pokhara, Nepal

Counselling services at Green Pastures Hospital (GPH), Pokhara, Nepal began in October 1993. A young Nepali nurse took up the half-time post and I, a Counselling Psychologist, joined her as her teacher and supervisor in January 1994. Our goal was to help reduce the negative effects of leprosy stigmatization on persons affected with leprosy through a psychosocial assessment of those in need and then follow-up individual counselling. We began to see referrals from GPH doctors and our own selection focusing on those who were somewhat confused, not interacting much with others, anxious, depressed and on rare occasions psychotic. From the above assessments it seemed to be clear that for some people stigmatization, whether initiated by self-rejection or rejection by others, was a common theme. We felt that the best way to talk about these feelings of rejection was through small support groups. Our groups run 5 x 2 hour sessions over 5 weeks. They composed of 5-6 individuals and divided into men's, women's and children's groups. In these groups people are encouraged to remember things from three phases in their lives: before contracting leprosy, after contracting leprosy up to the present, and life after leaving GPH. Themes which arise are stigmatization, depression, reconciliation, and dependency. Our discussions are supplemented by pictures used to further explain these themes. Using a Group Therapy method more people can be dealt with at one time, they learn from one another's successes and failures, and experience reduced levels of anxiety about their life after leaving GPH.

PS44

A POSITIVE OUTCOME IN COMMUNITY EYE HEALTH CARE SERVICE OF THE LEPROSY SUFFERES IN EASTERN INDIA IN THE LAST TWO DECADES :

Swapan K. Samanta, I.S. Roy

B.S. Medical College, Bankura, West Bengal,India

For many years, social stigma has kept the Leprosy sufferers away from all the social opportunities including the existing health care facilities for the general mass. In Pre Dapsone and Dapsone Era (i.e. upto 1988) Eye Health Care Services and comprehensive Eye health care camps were organised only in the leprosorium for these patients. The materialisation of the concept of 'Release from treatment' following successful Multi Drug Therapy has revolutionised the community eye health care delivery outlook in Eastern India. In post MDT Era the Leprosy affected persons are enjoying all the services rendered for the general healthy people whether in the general hospital or in the mass Eye Operation camps. Even the general healthy cataract blind people of the neighbouring villages, staying side by side of the Leprosy sufferer & accepting the same nursing , are undergoing surgery in the comprehensive Eye Camps being held within the After Care Leprosy colony campus by active organisation and participation of the after care leprosy sufferers organisation. TIhis is a great positive turn to our community Eye Health effort **'From darkness to light'**

PS45

THE SCHOLARSHIP PROJECT FOR CHILDREN OF LEPROSY PATIENTS

Türkan Saylan, Ayşe Karadeniz, Nermin Ersoy, Neşe Iyier, Dilek Pamuk

Istanbul Leprosy Hospital, Bakirkoy, 34747, Istanbul, Turkey

In this study, we have planned to give results of our scholarship projects. 53% of 545 students were male and 47% female. 72% of them were primary school students, 9 were university students.

We will give more information in the poster.

PS46

SOCIAL INTEGRATION THROUGH ECONOMIC REHABILITATION

Neela Shah, Atul Shah, Penny Grewal

Comprehensive Leprosy Care Projects, Ciba Compound, Tardeo, Mumbai, India .

Community based rehabilitation services has one important component of economic upliftment and social integration. Economic rehabilitation of PAL's who are physically, mentally or socially handicapped forms an integral part of any disability management program. A unique approach of identification of beneficiary from social history, status verification and need analysis has been adopted. The economic assistance was then made available, preferably in kind (for occupation) to the 188 PAL's. Their social status was closely monitored with follow-up of more than 5 years. The excellent results demonstrate that

majority of the PAL's have been well settled and support their family. In some instances the family members have also benefited by the aid. It is a sustainable development from human angle. There is no stigma associated with PAL's can be judged by sheer participation of community in such function and involvement of community leaders and opinion makers. Various other plans have shown their eagerness to spare the funds and be partners in making social integration through economic rehabilitation possible for large number of deserving cases. In fact, the integration of this aspect in other plans is necessary and will become the cornerstone of integration of leprosy disabled with other disabled. The concept, management and benefits will be presented.

PS47

THE SOCIAL REHABILITATION PROJECTS IN LEPROSY

Mücella Soydan, Turkan Saylan, Seval Koçaslan, Dilek Cakir

Istanbul Leprosy Hospital, Bakirkoy, 34747, Turkey

We realized that if we were able to rehabilitate leprosy patient socially in other words if we can create a new way of living and earning money for the treated patient we could prove the society and ourselves that leprosy could be really controlled in the near future.

For this reason we planned social projects for our patients. In this study we planned to give 106 projects. 60% of them were from rural area. 47% of the projects were animal projects. We helped them for house reconstruction also (n:23). We could find sponsor for 22%projects.

Their previous and present situation will discuss in the poster.

PS48

A SOCIAL INVESTIGATION OF CURED PERSONS AFFECTED BY LEPROSY IN COUNTIES ATTACHED TO SHANGHAI MUNICIPALITY

Zai-ming Wang et al

Shanghai Zunyi Hospital, Shanghai, China

The goal of basic eradication of leprosy was reached in Shanghai in 1990 and there are 1 411 cured persons affected by leprosy in its county area at present. A specially designed questionnaire was administered to 477 randomly selected subjects (male 344, female 133) with an average age of 61.8 years (52% of them >60 years) among the mentioned cures. Following points were observed in this study: 1) disability rate (WHO II & III grade) was as high as 59.75%, 2) 135 (28%) were illiterates, 277 (58%) primary level, 57 (12%) primary middle school level; 3) 43(9%) not married, 434 (91%) married, 4 (1%) divorsed, 91 (19%) benefit of spouse, 468 (98%) have a harmonious family; 4) there was still discrimination against cures (100, 21%) and cures'family (91, 19%), 5) 348 (72.96%) economically self-supported , but only 75 (15.7%) with an annual income of more than 4 000 yuan and 92(19.3%) less than 2 000 yuan, and as many as 112 (23.5%) cures are still in need of financial support from others; 6) 467 (98%) wish to get help from rehabilitation programme and 415 (87%) like to have home visit by medical workers; 7) 458(96%) are basically familiar with the symptoms of relapse and 472 (99%) will consult a doctor actively if relapse occurs.

The above findings indicated a big success achieved in leprosy control and a remarkable reduction of discrimination against persons affected by leprosy in Shanghai. But financial straits, daily life care and medical rehabilitation are serious problems to be solved for the remaining cures. A combined programme of leprosy rehabilitation and community based rehabilitation should be worked out and could be implemented smoothly.

PS49

DEFENSE STYLE ASSOCIATED WITH LEPROSY

Shang-wen Yi

Dong'an County Health and Epidemic Prevention Station, Dong'an, Hunan Province, China

The revised defense style questionnaire was administered to 8 outpatients with leprosy (male 7, female 1; average age 33 years) and to control subjects from the general population. The difference of mean score on immature defense style factors ($t=5.311$, $p<0.01$) and on rationalization factor ($t=4.394$, $p<0.01$) in patient's group was significantly higher than those in normal individuals. The patients had a greater tendency towards immature defense style with poor self-control consciousness and serious rationalization psychology. The author recognized that projection ($t=7.563$, $p<0.01$), passive aggression ($t=9.790$, $p<0.01$) and dependence ($t=6.250$, $p<0.01$) were main symptoms of immature defense style, and that in order to reduce the pressure from the community and to ease their psychological suffering they dealed with events they faced with concealment of disease and tried to cover their nervousness and uneasiness due to suffering from leprosy. The author also indicated that passive phycological defense style was more frequently observed in new patients without previous antileprosy therapy.

PS50

KNOWLEDGE AND ATTITUDE OF PHC WORKERS IN IBADAN METROPOLIS TOWARDS LEPROSY AND ITS INTEGRATION INTO PHC SERVICES

Raymond O. Olaseinde

Department of Physiotherapy, University College Hospital, Ibadan, Nigeria

Integration of leprosy services into Primary Health Care is a goal of the Nigerian Leprosy Control Programme that aims at making services cost-effective and accessible. Previous studies have shown that health workers do not differ from the general public in their aversive attitudes towards leprosy patients. This study was undertaken to document the knowledge and attitude of Local Government Area (LGA) health staff towards leprosy and integration into PHC in 5 LGAs that comprise Ibadan metropolis and to serve as a basis for planning training programmes. All available PHC staff working in the LGA clinics were interviewed using a self-administered questionnaire. Twenty questions, containing 135 knowledge items were used to produce a score about the cause, treatment, complications and management of leprosy. Sanitarians scored significantly higher (90 points) than Nurse/Midwives (87) and Community Health Extension Workers (82) ($p<0.0004$). Though few had previous inservice training in leprosy (14%), those who had training scored higher (90) than those who did not (84) ($p<0.006$). Two attitude scales measured attitudes towards patients and towards integration of services. Both were significantly higher for persons who had attended inservice training. The results point to the value of and need for more training.

REHABILITATION

RE01

SURVEY OF DISABILITY RATES IN 28,674 PERSONS AFFECTED BY LEPROSY IN JIANGSU PROVINCE, P R OF CHINA

Zhang Lianhua, Xie Zhizheng, Xie Zhizheng, He Yuhui et al
Jiangsu Provincial Institute of Dermatology, P R of China

A survey of impairments and disability was carried out in Jiangsu Province at the end of 1996 to provide data useful for planning a provincial rehabilitation programme. Findings showed that the disability rate (WHO grades 1-3) was 61.42% overall with very significant differences related to sex, leprosy classification, literacy and occupation. Experience gained during the survey showed that the disability rate influenced the patients' capability of work and activities of daily living. Impairment and disability sometimes commenced during or after treatment, but most frequently before start of treatment. The proportion of new cases who were detected within two years of observing the first signs of leprosy was in inverse proportion to the grade II disability rate among those patients. The authors emphasise the importance of early detection and treatment of leprosy and neuritis and of self-care training for those with nerve function impairment. Study findings illustrate the fact that the earlier that impairment prevention and rehabilitation measures are instituted the better. Involvement of the whole of society in programmes of leprosy rehabilitation is important and welcomed.

Key words: Leprosy Disability Prevention Rehabilitation

RE02

RELEVANCE TO FUTURE PLANNING OF LESSONS LEARNED DURING THE CHINA NATIONAL REHABILITATION PROJECT

Jean Watson, Zhang Guocheng, Yan Liang Bin, Jiang Juan,
Wei Xiaoyu, Angelika Piefer

The National Centre for Leprosy Control, P R China

A national, China Leprosy Rehabilitation Project, undertaken in 2 stages during the years 1990-1998, is described. This was a collaboration project between the Ministry of Health of P R of China, The Leprosy Mission International and other ILEP organisations. Numbers of cases involved totaled 13,000 in stage 1 from 1990-1993 and 27,959 in stage 2 from 1995-1998. The first project objective was to improve and complete the management and supervision systems in preparation for future national projects. Specific objectives related to preservation of nerve function, prevention and overcoming of secondary impairments and improvement of function. Management experience is described in areas such as:

- selection of cases out of large numbers having nerve dysfunction;
- use of measurable indicators and design of evaluation forms ;
- the importance of on the job, skill and problem-solving training ;
- the importance of effective, in-depth, staff-patient communication if patients' self-care is to be related to their individual circumstances.

Benefits of this project could usefully be extended to thousands of leprosy affected persons living outside the current project areas. The paper outlines some management lessons learned from project experiences and their relevance to forward planning of activities designed to minimise impairments and thus their effects on lives of leprosy-affected persons and their families and communities.

RE03

A SCALE TO ASSESS ACTIVITIES OF DAILY LIVING IN PERSONS AFFECTED BY LEPROSY

Wim H. van Brakel, Alison M. Anderson, Michiel de Boer, Erik Scholten, Frauke C. Wörpel, Rohit Saiju, Hari B. BK, Sambha Sherpa, Shaha K. Sunwar, Juna Gurung.

Green Pastures Hospital, PO Box 28, Pokhara, Nepal, (wvbrakel@mos.com.np)

PURPOSE: To describe the development of a scale to assess difficulty in activities of daily living experienced by people in rural areas of developing countries, such as Nepal.

METHOD: Staff experienced in working with leprosy affected people were consulted about activities of daily living they thought should be included in an assessment. A 68-question survey questionnaire was made, sampling five domains of the Disability (D) classification of the International Classification of Impairments, Disabilities and Handicaps (ICIDH, WHO, 1980). Basic on a survey using this questionnaire, some questions were omitted and a few new ones were added. These were rearranged into a new questionnaire. This new questionnaire was translated and back-translated to check the understanding of the wording. Criterion validity was checked by comparing the sum score of the scale with a sum score given by a panel of experienced staff in a sample of 37 patients. Intra and inter-interviewer reliability was assessed on 29 patients using weighted kappa statistics. Stability over a period of a week was evaluated in a similar way. Considering the results of these studies, several questions showing weak reliability or stability were omitted.
RESULTS: Of the original 68 questions, 38 were included in second draft of the instrument. Five questions were added to assess difficulty in relationships, one question about the use of assistive devices and two about occupation and employment. The sum score of the scale against the expert score gave a Spearman correlation coefficient of 0.72. Intra- and inter-interviewer reliability testing gave kappa values of 0.77 (95%CI 0.73-0.81) and 0.61 (95%CI 0.56-0.67), respectively. The stability test resulted in a kappa of 0.76 (95%CI 0.70-0.82). Four questions that gave very poor results were omitted from the final draft of the instrument.
CONCLUSION: A questionnaire-based scale was developed to assess difficulty experienced in activities of daily living in persons affected by leprosy living in rural areas of a developing country - the Green Pastures Activity Scale. The assessment, based on the D-classification of the ICIDH, performed well during validity and reliability testing. The GPAS consists of 34 activity questions, 5 relationship questions, and 3 questions on the use of assistive devices, occupation and employment. It can be used be used in needs assessment for rehabilitation and for objective-oriented evaluation of the success of rehabilitation interventions, such as surgery, and physio and occupational therapy.

RE04

USE OF THE EYES, HANDS, FEET (EHF) SCORE AS AN IMPAIRMENT SEVERITY SCORE IN LEPROSY

Wim H. van Brakel, Naomi K. Reed, Darren S. Reed.

INF RELEASE Project, P.O. Box 5, Pokhara Nepal, e-mail: wvbrakel@mos.com.np

PURPOSE: To discuss the concepts of 'classification' and 'severity grading' in relation to impairment in leprosy, and to describe the use of an impairment sum score, the Eyes, Hands, Feet (EHF) score, as an indicator of the severity and the evolution of impairment over time.

METHODS: The use of an impairment sum score, the EHF score, is illustrated using data on impairment at diagnosis and after a two-year interval from MB patients released from MDT in the Western Region of Nepal. The WHO 1988 'disability' grading scale (0-2, for both eyes, hands and feet - six sites) was used as a measure of impairment. For the analysis the WHO grades for the six sites were summed to form an Eyes, Hands, Feet (EHF) score (minimum 0, maximum 12). The sensitivity to change over time of the EHF score was compared with that of the 'method of maximum grades'.

RESULTS: Using the 'method of maximum grades', 509/706 patients (72%) appeared not to have changed in impairment status versus only 399 (57%) with the EHF score. Improvement or deterioration of impairment status was missed in 113 patients (16%). In 216/706 patients (31%), the changes detected with the EHF score were bigger than those revealed by the method of maximum grades.

CONCLUSIONS: The six components of the WHO impairment grading may be added up to form a E(yes)H(ands)F(eet) sum score of impairment. This score can be used to monitor changes in impairment status in individual or groups of patients. It should be recorded and reported at least at diagnosis and release from treatment. Reporting could be done as the 'proportion of patients with improved EHF score', 'stable EHF score' and 'EHF score worse', and 'proportion of patients without impairment', 'proportion with WHO grade 1' and 'proportion with WHO grade 2'.

RE05

AN ICIDH-BASED SURVEY OF DISABILITY IN PERSONS AFFECTED BY LEPROSY

Wim H. van Brakel, Alison M. Anderson

INF RELEASE Project, P.O. Box 5, Pokhara Nepal, e-mail: wvbrakel@mos.com.np

PURPOSE: To describe the results of a survey aimed at describing disability in people affected by leprosy.

METHOD: A survey was carried out using a questionnaire containing 74 questions on activities of daily living. Two hundred and sixty-nine persons affected by leprosy were interviewed.

RESULTS: The prevalence of different types of impairment in this sample ranged from 7.6% (foot drop) to 36% (weakness little finger abduction). The most commonly affected indoor activities were shaving (25%), cutting nails (22%) and tying a knot (18%). Among the outdoor activities, running, ploughing, threshing and milking a cow or buffalo were the most commonly affected (26-34%).

CONCLUSIONS: Disability as defined in the 'International Classification of Impairments, Disabilities and Handicaps' (ICIDH) has received little attention in the field of leprosy. This survey shows that 1) experiencing more severe difficulties with activities of daily life (ADL) is a common problem in persons with chronic impairments due to leprosy, and 2) the level of difficulty can be assessed and measured.

As disability is a main outcome of interest in rehabilitation, we recommend that efforts should be made to include an ADL assessment as a standard activity for monitoring and evaluation of rehabilitation, both for individuals and on programme level. Knowledge of the disability status of a person will be valuable in needs-assessment for rehabilitation interventions and in clinical decision making regarding surgical and other treatment.

RE06

RAPID APPAISAL IN ASSESSMENT OF THE FACTORS RELATED TO LEPROSY REHABILITATION - A PRELIMINARY REPORT

Shu-min Chen, * Cun-lian Han ,** Bing Li ,* Rong-tao Zheng ,* Lin Zhang * and Xue-dong Wang **
Shandong Provincial Institute of Dermatology, Jinan City, Shandong Province, China

To determine the knowledge and attitudes of key persons directly involved in leprosy rehabilitation at basic levels and to explore the possible factors having influence on leprosy rehabilitation, a sectional study, using rapid appraisal approach , i.e. an interview with interviewer-administered questionnaire, was conducted for 39 leprosy disabled patients, 35 rural doctors, 10 paramedical workers at township level and 37 village heads in which the disabled individuals due to leprosy live within 10 days.

Results: The willingness for leprosy disability rehabilitation was not associated with the demographic characteristics of the disabled patients. The disabled, rural doctors and paramedical workers were lack of basic knowledge on leprosy and disability due to this disease. There still was some stigma reflecting in the refusal of some village heads (49%) to contact with the disabled people affected by leprosy. 41% of the disabled, 69% of rural doctors, 80% of paramedical workers and 81% of the heads of villages did not correctly recognized who would have the responsibility for lepresy rehabilitation.

The authors concluded and recommended: 1) for very individulized needs and attitudes towards leprosy rehabilitaion among leprosy disabled persons, the methodology to be used in leprosy rehabilitation programmes must be different from that utilized in current vertical leprosy control programme; 2) most leprosy disabled patients are cures of aged people (80% of them >50 years) with permanent peripheral never damage in varying degrees and needs of life-long care, a modle of community-based rehabilitation approach should be considered; 3) training of medical staff at basic levels, especially at village and township levels would be very crucial in the success of the rehabilitaion project; and 4) for the purpose of creating a favorable social emvironment to develop and implement rehabilitation programme, motivation and involvement of the heads of villages in disability rehabilitation must be very important.

RE07

COPING PATTERNS AMONG LEPROSY AND NON-LEPROSY DISABLED CASES

Manisha Saxena, and Vijay Kochar,
Faculty Member, RTCH, FPAI, 20-2-753,
Doodh Bowli Road,Hyderabad-500 064(A.P.)INDIA.

Some times identically disabled persons exhibit differential adaptation when faced with the functional demands of mobility, personal hygiene, household work etc. This reflects the relative success or failure of different patterns of coping. Hence this study intends to examine the coping mechanisms of the study cases and suggest interventions.

The experimental group in the study comprises of leprosy cases and the control group of non-leprosy disabled cases. Basing on both physical and functional ability the study cases were classified into four broad groups.

The population of tne study is composed of 100 leprosy cases and 100 non-leprosy disabled cases. Direct personal interview method using structured schedule complemented with observations was used for data collections. Some case studies were also conducted. About 50 significant others and 40 health workers were informally interviewed to study their perceptions.

The study reveals the relative success and failure of different coping mechanism among both the leprosy and non-leprosy disabled cases. The suggested intervention to enhance coping mechanisms will be discussed in detail at the time of presentation of this paper.

*The Study is based on Ph.D. Thesis.

RE08

A SOCIOLOGICAL STUDY OF REHABILITATION AMONG LEPROSY AND NON-LEPROSY DISABLED CASES

Manisha Saxena and Vijay Kochar
Faculty Member, RTCH, FPAI, 20-2-753,
Doodh Bowli Road, HYDERABAD-500 064, (A.P.), India.

Rehabilitation must not only deal with physical restoration but also with the psycho-social and economic effects induced by the disease and disability. Hence in this study Rehabilitation was studied from physical, social, psychological and economic perspectives. The study attempts to understand the interplay of various factors associated with leprosy and non-leprosy disabled cases which are shaping the rehabilitation process.

The experimental group in the study comprises of leprosy cases and the control group of non-leprosy disabled cases. The respondents were classified into four broad groups basing on the extent of rehabilitation

The sample of the study was composed of 100 leprosy cases and 100 non-leprosy disabled cases. Direct personal interview method using structured schedule complemented with observations was used for data collection. Some case studies were also conducted. About 50 significant others and 40 health workers were informally interviewed to study their perceptions.

The study reveals the process of rehabilitation in the context and framework of disability. The conclusions of the study would help to formulate rehabilitation programme basing on the magnitude of the rehabilitation problem and will be discussed in detail at the time of presentation of this paper.

* The study is based on Ph.D. Thesis.

RE09

STAGES IN THE REHABILITATION OF THE LEPROSY HANDICAPPED

(AS ORGANISED BY POONA DISTRICT LEPROSY COMMITTEE)

Vithal Jadhav, Vilas Kabadgi and Jal Mehta

Poona District Leprosy Committee, Pune, India.

Leprosy Rehabilitation is a challenging process. Poona District Leprosy Committee has been working on this for last several years and has demonstrated the following stages in the Rehabilitation process.

i) Individual Rehabilitation: 177 patients
ii) Intensive Group Rehabilitation-CBR: 122 patients
iii) Intensive Group Rehabilitation-CBR:200 patients (eg.Powerloom)
iv) Industrial Socio-Economic Rehabilitation 400 patients - Advanced CBR
v) Co-operative society: 100 patients

All these stages are discussed in detail in the text of the paper and will be demonstrated by coloured transparancies and with

the help of video clippings (VHS format of PAL/Secan/System) from the film "Mehta Co-operative Rehabilitation Model".

This has led to not only Rehabilitation of individual patient but of the entire family which has been brought back into the mainstream of'Normal' society. The success of the programme is emphasised as it is working for last 18 years and could well serve as a model not only for other leprosy centres but also for those working in the field of other handicapped.

RE10

CARE-AFTER-CURE PROGRAMS TOWARDS A WORLD WITHOUT LEPROSY

Geetha A. Joseph and Rao PSS

Schieffelin Leprosy Research and Training Centre, Karigiri, India.

Concepts on Care After Cure (CAC) are not necessarily unique to leprosy and have been practiced in several chronic diseases. However CAC programme for leprosy are in some ways different and should adopt realistic strategies, taking into account both the physical and socio economic ravages of the disease. Since 1987, we have experimented with CAC programmes in our control areas. In this paper our experiences in the Chitoor District of Andhra Pradesh are shared as we prepare towards a world where leprosy and its potential damage are contained.

Spread over 512 sq. kms. the study area has a population of approx. 150,000 where leprosy control activities were carried out since 1979. A total of 3284 patients have been registered and treated for leprosy. Barring those who had died or left the area,1382 peersons were followed up so far. Of these 280 had Grade 2 deformities due to leprosy and the others had varying degrees of general and leprosy related complaints.

The programme consisted of 3 clearly defined activities: health education to empower families and individuals to care for themselves; Institutional provision of curative / reconstructive services for management and prevention of disability and socio economic rehabilitation. Specific inputs that were required and their impact are presented and discussed.

RE11

PREVENTION OF DISABILITY AND REHABILITATION FOR THE LEPROSY AFFECTED IN CHINA.

Ministry of Health, P R of China.

A Chinese, National Leprosy Rehabilitation Project was undertaken between 1990 and 1998 by the Ministry of Health in collaboration with The Leprosy Mission International and other ILEP organisations. This involved pilot experiments in activities to prevent and overcome impairments and to serve as examples for further development of rehabilitation work in China and in Asia. More than 50% of the 299,000 accumulated leprosy cases alive at the end of 1996 had nerve function impairment affecting face, hands or feet.

This paper describes the two stages of the project, the second taking place from 1995-98 in support of 27,959 leprosy affected persons in 14 provinces. Project principles, objectives and activities are outlined together with the roles of the Ministry of Health and the National Centre for Leprosy Control in project organisation. The Ministry initiated disability prevention activities and delegated responsibility for implementation to the National Centre. The Centre organised surveys to identify needs, planned project activities and trained national and provincial leprosy staff. The Centre rehabilitation team, together with Leprosy Mission International experts, was responsible for ongoing technical project supervision. Sasakawa Foundation supported provincial and national training programmes. Improvements made in stage two are described. Outcomes are summarised in this paper and detailed in other papers. The importance of continuation of disability prevention and leprosy rehabilitation activities in China is emphasised.

RE12

COMMUNITY BASED REHABILITATION OF LEPROSY PATIENTS IN GHANA

George Abram and Kobina Atta Bainson

International Anti Leprosy Organization, P. O. Box 851, Takoradi, Ghana
Ghana Leprosy Service, P. O. Box A99, Cape Coast, Ghana

In the past two decades, institutionalised rehabilitation of leprosy patients in Ghana has been discouraged, and therefore leprosy patients have been treated and rehabilitated within or close to their communities. Only a few old and often severely disabled patients are permanently cared for in sheltered institutions.

Ghana has an extended family system which offers considerable social support to all non-self-sufficient people (children, elderly, sick and disabled people) within their communities.

For disabled people, including leprosy patients, this "natural welfare system" is supported by multi-sectorial teams which include health, social, and community development workers and educators, who provide a holistic rehabilitation programme at all levels.

RE13

IDENTIFYING TARGET GROUPS FOR SOCIO-ECONOMIC DEVELOPMENT IN LEPROSY

Dr.P.K.Gopal, Mr.T.Jayaraj Devadas & Mr.G.R.Srinivasan

IDEA INDIA, 58, Selvam Nagar, Collectorate P.O. Erode-638 011. INDIA.

As leprosy is eliminated as a Public Health Problem throughout much of the world, emphasis will increasingly need to be placed on the social aspects of the disease. Most countries faced with the problems of leprosy have focussed their efforts on medical and control aspects, but socio-economic issues have not received adequate attention.

When at least some data are available on physical disability the data on social and economic disabilities of leprosy affected persons is not available.

As per the studies made in the field of rehabilitation, the leprosy affected persons have been divided into six categories for the purpose of socio-economic assistance.

The study describes the application of the methodology to select the eligible individuals for social and economic rehabilitation. The authors conducted a sample study for categorizing the leprosy affected persons. A total number of 53,000 leprosy affected persons were assessed and eligible persons have been identified.

This methodology could be applied in any region for starting social and economic action for leprosy affected persons.

RE14

PREVENTION AND CORRECTION OF CLAW HAND BY SPLINT APPLICATION.

P V DAVE, K N PATEL

MODIFIED LEPROSY CONTROL UNIT, CIVIL HOSPITAL, NADIAD,GUJARAT,INDIA.

In present study, 126 leprosy cases with different type of claw hand deformity were selected from the rural area of Kheda District. These patients which were selected for study were under treatment, RFT & RFC. Different varities of splints like Adductor Band, Loops, Gutter Splints were given. Ink impression in graph book was taken for each patient. Regularity of splint application was followed & final follow up with ink impression was done after 3 months duration. Angle measurement was done for few patients. Result will be discussed in details, during presentation.

RE15

FIRST BRAZILIAN ELECTROMYOGRAPHY (EMG) NETWORK BETWEEN HANSEN'S DISEASE (HD) REHABILITATION CENTERS

José Garbino

"Lauro de Souza Lima", Research Institute, Bauru, SP, São Julião Hospital, Campo Grande, MS, Brazil

The Nerve Conduction Studies (NCS) are applied world-wide as the choice method to assess the Peripheral Neuropathies. It's specially used in HD to evaluate the severity of nerve injury, to determine the characteristics of the lesion, to make the foresight of the outcome, and on these basis to elaborate the terapeutic decision. Nevertheless this method is not available to overall patients, other simple and useful methods are applied. There are not suficient doctors to make NCS, even in HD Rehabilitation Centers, where researches about treatment monitoring protocols must be developed. In order to improve the HD Rehabilitation Centers on this subject,we have looked for a system to be managed by a technician and supervised by a doctor at a distande. There is already this system, and we have found out it in Sweden, in the Department of Clinic Neurophysiology, University Hospital Uppsala. The author shows the experience of the First Brazilian EMG network.

RE16

EVOLUTION OF NERVE DAMAGE IN LEPROSY - AN INTEGRATED VIEW OF TWO DECADES

Antia, N. H. and Shetty V.P.

The Foundation for Medical Research, 84-A, R.G.Thadani Marg, Worli, Mumbai 400 018, India.

Systematic and concerted efforts in understanding the process of nerve damage in leprosy have been undertaken by a multidisciplinary team at The Foundation in the last two decades. The observations have had important implications in the basic neurological sciences as well as in understanding of mechanisms of pathophysiology, immunology, and microbiology of the disease. Furthermore the studies have helped to devise tests for monitoring of chemotherapy and clinical relapses, understanding precipitation of debilitating reactions, immunological and regenerative potential of peripheral nerves and highlighting the role of persistor organisms in recurrence of leprosy.

The important findings and their implications will be presented in the poster.

RE17

SOCIO -ECONOMIC REHABILITATION OF PEOPLE WITH LEPROSY TOWARDS A WORLD WITHOUT LEPROSY BY THE YEAR 2000 AD AND BEYOND

In many diseases, rehabilitation is an afterthought. When a patient is cured, then we think about getting him back to his home, work Community e.t.c.

In Leprosy rehabilitation is an intergral part of the programme of prevention as well of As treatment and of final restoration to national Social relationships.

Being a crippling and disabling diease, leprosy is second to poliomylitis in developing countries. Affected persons are disturbed and find it difficult to live in Communities like those not afflicted by the disease

Without effective rehabilitation, Leprosy Control is a failure because patients will not be willing to expose themselves for treatment unless they can see that others who have done so have been able to return to a meaningful existence.

Without effective rehabilitation measures, medical treatment may also be a failure because patients who are rendered free from mycobacterium Leprae can never be called cured if they are left with blindness and crippling deformities and disabilities as a sequel of the disease

To realise the dream of eliminating/eradicating leprosy by the year 2000 A.D. will be possible if and only if the problem of rehabilitation (Social/and economic) of leprosy persons is effectively addressed

RE18

MASTER PLAN FOR A SOCIO ECONOMIC REHABILITATION OF THE DISPLACED LEPROSY AFFECTED PERSONS IN INDIA - A PROPOSAL.

G.R. Srinivasan, T. Jayaraj Devadas
GLRA/ALES-INDIA, #4, Gajapathy Street, Shenoy Nagar, Chennai 600030.

In a country like INDIA considering the size of the leprosy problem, the Socio economic rehabilitation is indeed a formidable challenge. Different voluntary organisation are involved in different aspects along with the services offered by the Government. It is necessary to workout an integrated Rehabilitation plan with a well co-ordinated networking arrangement with the existing programme of the Government as well as that of the voluntary agency.

It is estimated that 30% of the 800,000 leprosy affected persons who require attention are found to be displaced and out of this 25% of them are already availing help from the existing facilities of the Government and Voluntary organisations. This will work out to a total of 180,000 persons needing rehabilitation interventions.

As a methodology it is planned to provide loans, educational assistance, Aids and Appliances and Offer training, counselling, motivation and help them to market the product after assessing their needs and aptitudes.

For implementing the programme the country can be divided in to 4 regions (East, West, North and South) and identify 20 nodal agencies in each region. These nodal agencies can be identified out of the active units of the Governments or Voluntary organisations existing in the region. The programme will be phased out for 5 years.

The budget for implementing the programme will come to around Rs. 3,040/- (US $80) per patient which is inclusive of organisational expenses.

RE19

SOCIAL-ECONOMIC REHABILITATION OF LEPROSY - AN ANALYSIS REPORT

Zheng-dong Guo*, Xiao-yu Liao* Zi-shan Zhao# and Xi-bao Zhang#
* Dongguan City Hospital for Chronic Disease Control, Guangdong Province, China
# Guangdong Provincial Institute of Dermatology, Guangzhou City, China

Donguan city had once been a high leprosy epidemic area. The total number of registered leprosy patientas was 3 990. Out of them , 3,650 were cured patients. For solving the living problems of those homeless cured patients , in 1965 the local goverment built a welfare facility with an area of 500 hectares including a building area of 30 000 square meters. Three hundred and thirty six (222 males and 114 females) live in this facility at present with an average age of 61 years. One hundred and ninety eight of them are disabled (more than WHO grade II) people. Through 30 years of construction, a social-economic rehabilitation community of leprosy has built up with the support of the government. In view of the market needs and the characteristics of the residents, up to now 44 chicken farms have been built up producing 500 000 chickens and 4 000 000 chicks annually. The production income increses year by year reaching 1 135 000 Chinese yuan in 1996. Vocational training of the residents and inviting technical staffs for guidance have been carried out in order to raise production efficiency continuously. " Distribution according to work " system has been developed on the basis of ensuring the basic living expenses. The residents' income increased gradually and steadily. The residents' rights have been respected and quite a number of them already returned back to the society. One hundred and eighty residents have married. In addition, residents are provided with medical care and rehabilitation help providing them protective shoes and artificial limbs if needed. The authors pointed out that the mentioned example could be a way of cutting the government's financial burden and benifiting the society, the patients and their families.

RE20

GRIP-AIDS TO IMPROVE ORAL HEALTH IN HIGHLY DISABLED LEPROSY PATIENTS

S.Kingsley, A.P.Tripathi,V.V.Pai and R.Ganapati

Bombay Leprosy Project, Sion-Chunabhatti, Bombay - 400 022, India

Leprosy patients with grossly mutilated hands experience tremendous difficulties to maintain dental hygeine. In a study of 120 patients of different types of leprosy, 40% were found to have significant orodental changes (Sharma N.K et al, 1996). We believe that even patients with severe handicaps could be helped to prevent serious sequale by innovative adaptations like grip-aids.

The WHO theme of 1994 viz. "Oral Health for Healthy Life" stressed the need for "inexpensive and culturally acceptable" methods for offering dental care which synchronised with our observations on araldite ("M-Seal") grip-aids on tooth brushes. We provided grip-aids on tooth brushes and distributed tooth paste containing fluorides to 20 leprosy patients with hand deformities in order to restore and maintain oral health.

All patients were subjected for clinical examination for dental problems by a qualified dentist. Initially 15 out of 20 patients had dental caries with partial resorption of the calcified structure of the tooth caused by dental plaque. Two patients had acute pulpitis caused by odontogenic infection and three patients had gingivitis. After a mean follow-up period of one year, it was observed that the grip-aid had prevented the formation of dental plaque and protected the tooth against development of caries in 16 (80%) patients. The grip-aid had also helped in increased frequency of brushing in all the patients. We believe that for restoration of dignity of deformed patients and establishing human relations in the society, this simple device may be helpful by improving the oral hygiene.

RE21

L'USAGE DE BOTTE DE UNNA ÉLASTIQUE DANS LE TRAITEMENT D'ULCÈRE PLANTER EN PACIENTS LEPREUX: MANAUS-AM-BRÉSIL.

M.A.Q. Moraes, P.A.Cunha, T.H.S.Sales, H.A.Oliveira

Instituto de Dermatologia Tropical e Venereologia "Alfredo da Matta"
Rua Codajás, 24 - Cachoeirinha
Manaus - Amazonas - Brasil - 69065-130

La perte de la sensibilité est usuellement le premier symptôme de déficit neural dans la lèpre, avec la diminution de la sensation de la température et douleur en arrivant avant, une perte de la sensation de sensibilité et pression. Aux pieds, la sensation de douleur protège pas seulement contre les objests pointaigus, mais aussi contre les effets d'excessive pression en les ares de la région planter, bien que, la perte de la sensibilité soit minimum, les pressions exercées dans le régions planters peuvent porter à la nécrose aseptiques du graisseux tissu en laissant cette are assez susceptible à traumatisme, l'ulcération et l'infection. En ces atteintes répétés sont avec beaucoup de fréquence, les majeures causes de mutilations observées en membres inferieures de pacients lepreux avec déficit neural.

En cet'étude prospectif, fait avec l'usage de la Botte de Unna Élastique, materiel à la base de bandage élastique, en contenant l'ozido de zinc que n'endurce pas, l'acacia, la glycérine, l'huile de castor, et le pretolato blanche, usuellement indiqué en ulcères veineux de la jambe et d'oedème lymphatique et cet étude là a été usagé au traitement de pacients lepreux avec l'ulcère planter et les resultads ont été animateurs.

Cet étude a reçu le support financier du laboratoire "CONVATEC".

RE22

A PRELIMINARY REPORT OF COMMUNITY BASED REHABILITATION IN URBAN AND RURAL AREA

S. Joshi, P. Kathe and S.S. Naik
Acworth Leprosy Hospital Society for Research, Rehabilitation and Education in Leprosy, Wadala, Mumbai-400 031, India.

In view of World heading towards leprosy elimination the concept of Community Based Rehabilitation has replaced the institutional rehabilitation for leprosy patients. The pilot study was undertaken to find out the feasibility of Community Based Rehabilitation in slum of Mumbai and rural area of Raigad district of Maharashtra State. After examination of 8135 persons in the slum of Mumbai 65 disabled persons (Rate 7.9/1000) were detected of which 11 were leprosy patients (Rate 1.3/1000). In rural area after examination of 4342 persons 28 disabled persons were detected (Rate 6.4/1000) of which 8 were leprosy patients (Rate 1.8/1000). It seems that the general disability rate and leprosy disability rate in slums of Mumbai and in the rural area is practically the same.

It is further noticed that disability rate is higher in males, more unemployment in disabled, more in rural area, polio is major caused for disability and disability due to accident is more in urban area.

With the help of community leaders, the introduction of these disabled persons to the institutes having facilities of training, job placement and financial assistance to their business is initiated which is giving positive response. The details of same will be presented.

RE23

ACTIVITIES OF HANDA ASSOCIATION IN GUANGZHOU FOR 1996–1997

Lihe Yang, Ruth C.Winslow and Xin Tang

Guangdong HANDA Rehabilitation and Welfare Association

Guangdong HANDA Rehabilitation and Welfare Association (abbreviated as HANDA) was Established on August 19,1996.

HANDA received 1,400,000 RMB (about US$ 170,000)from 10 charity organizations and 53 individuals of the world in the past two years.

The activities of HANDA in the past two years are as follows:

1.A Swallow Sewing School for training people affected by HD.Thirty-five persons affected by HD graduated from the school and obtained jobs.

2.Two fish farms for people affected by HD to develop their economy and become more self-confficient.

3.A Chinese medicine herb farm for people affected by HD to make money to improve their living situation.

4.Two orchards for people affected by HD.

5.A chicken farm.

6.Eye operations for people with HD who had eye diseases.There were 34 visual impaired people regained their vision.

7.Seven hundred and nineteen spectacles given to people with HD for protecting their eyes.

8.Helped people with HD to treat their own planta ulcers.About 30% planta ulcers had been cured.

9.Six hundred and nineteen pairs of shoes given to people with HD who had foot trouble.

10.Made 250 new clothes for people with HD at three villages.

11.Gave scholsrship,25,000 RMB (about US$ 3,000) worth,to 45 children of people with HD to attend school.

12.Sent 4 people recovered from HD to work at shoe factory.

13.Sent 6 people recovered from HD to attend three international meeting on rehabilitation of HD in Brazil,Korea and Spain.

RE24

KIVUVU.
MORE A REFUGE THAN A REHABILITATION CENTER

Martin Ndombe. Barthelemy Dunda
The leprosy Mission Congo Co-ordination Office. Kinshasa, Congo.

Kivuvu Rehabilitation Center is located in Bas-Congo Province, Democratic Republic of Congo.

Previously used as "Leprosy Hospital", Kivuvu had no choice but to be transformed into a rehabilitation Center for almost 10 years, after Primary health care and Integration became national health policy in the country.

As a rehabilitation center, mostly Kivuvu takes care of severe ulcers, reactions and foot wear needs. Some projects, as mill, beans and onion fields, are managed in order to assist admitted patients.

20 patients were almost permanent in the center during the year 1996, among them 14 with severe ulcers needing strict bed rest, and 6 with less severe lesions staying around in the village. During that year, the average of stay period in the center was 3 months.

From different surveys done, it appears that most of the RFT patients (Released from treatment), would prefer to stay at the center rather than going back in their villages where they live abandoned by relatives and friends.

That raises the problem of leprosy stigma that is still high among the population, remaining a big obstacle for leprosy integration both in the public health system, and in the society. Good heath education, self-care group initiatives, and also health workers motivation remain the key for real integration.

SURGERY

SU01

OUTCOMES OF RECONSTRUCTIVE SURGERY IN LEPROSY - A FUNCTIONAL, SOCIO-ECONOMIC AND REHABILITATION PERSPECTIVE.

Santosh Rath, Tilak Chauvan & Nabor Soreny

LEPRA - HOINA Reconstructive Surgery Unit, Muniguda, Orissa, India.

Sonepur district with a population of 500,000 had prevalance rate of 228/10,000 and deformity rate of 7%. In the past 3 years over 200 patients from this district have had reconstructive surgery for hands and feet following completion of MDT. Most patients are from a rural background and enyayed in agriculture. A study was undertaken to asses the outcomes of deformity correction on the individual, family and society. The thrust was to asses the effects of deformity correction on function, cosmesis, work performance, earning level, personality, attitude, confidence and expectiations. The impact on the family, relationships, social barriers and chanyes in acceptance was assessed. An effort was made through village discussions to determine the impact that deformity correction has had in making the disease socially acceptable. Most clients returned to their original occupation and to their own homes. Motivation was an important factor in the individual's final rehabilitation. Nearly all surgical failures (8%) had poor motivation and did not adhere to post operative programme. The factors influencing the outcome of surgical reconstruction along with the impact of deformity correction on the individual and the socio-economic asspects will be presented.

SU02

LONG-TERM FOLLOW UP OF JOINT STABILIZATION PROCEDURES IN THE TREATMENT OF DEFORMED FEET IN LEPROSY

Zai-ming Wang, Fu-tian Li and Li-wen Dong
Shanghai Zunyi Hospital, Shanghai , China

Joint arthrodesis has been proved very effective in correcting leprosy deformed feet and in treating leprosy sole ulcers as well, and consequently can prevent some patients from suffering due to amputation. Foot joint stabilization procedures were performed in 41 feet (24 of them with sole ulcers) of 36 patients. Triple arthrodesis was done in 12 feet, ankle arthrodesis in 27 and pantalar in 2. Satisfactory immediate results of the procedure were observed in 37 but the remaining 4 not in success. The former 37 feet were followed up for a period of 2-32 years, 35 (94.6%) among them more than 10 years. It was found that the walking ability of all 37 feet improved, sole ulcers occurred in 15 feet less than 10 years and only one amputation was done 20 years after doing joint stabilization procedures were performed respectively. Correction of deformed feet in leprosy by joint stabilization procedures has helped the patient to retain and use his own limb with its advantages for more than 10 years in average at least. The time of use for the operated limbs will definitely be prolonged if the patients could persist in doing self care.

SU03

Title : RECONSTRUCTIVE SURGERY OF DEFORMITIES IN HANSENS DISEASE IN THE CAMPS. AN EVALUATION AND LONG TERM FOLLOW UP.

Authors : Dr.K.S.Rao, Dr.M.K.Siddalinga Swamy, Dr.Betal, Dr.Patond.
Central Institute of Orthopeadics, Safdarjang Hospital, New Delhi-29.

Abstract : Deformities are quite common in Leprosy patients. Very few centres are available for reconstructive surgery which may be quite faraway from the place of residence of the patients. A novel method of reconstructive surgery on a camp basis at a near place to the patients was undertaken. Chandrapur a district in Maharashtra was considered after a rapport with the district leprosy officer. He was advised to examine and collect the case of deformities at his district hospital. A team of surgeons from central leprosy teaching and research institute along with local orthopaedic surgeons a camp was held during 1992, 1993 and 1994. All the patients were examined and correctable deformities like claw fingers, drop foot and lagopthalmos were selected for surgery. The surgical camp was held on two days in an year. The patients were given preoperative and postoperative exercise awareness by the physiotherapist . A total of 70 case were operated in 3 yeras. After surgery the patients were sent home and called for regular follow up which was done by the local orthopaedic surgeons. The physiotherapist visited their houses to give and advise postoperative excercises. The expert team examined the operated cases when they went for the next year for surgery. 48 claw finger, 10 drop foot and 12 lagoptnalmos corrections were carried out in these years. Correction was satisfactory in 90% of patients. Complications were mainly due to non coperative patients, who did not come for followup regularly. Therefore it is ideal to conduct reconstructive sugery in leprosy patients in the camps with the cooperation of experts and local organisations. More over the patients stays in his house and the hardship of travelling and staying in leprosy hospitals in prevented.

SU04

LEPROSY AFFECTS FACIAL NERVES IN A SCATTERED WAY FROM THE MAIN TRUNK TO ALL PERIPHERAL BRANCHES

E. Turkof[1], B. Richard[2], E. Knolle[3], B. Katri[2], R. Ciovica[1], S.Tambwekar[4]

1 Dept Plast Reconstr Surg , 3.Dept.Anaesthesia, Vienna-Univ Clinic,Austria
2 Green Pasture Hosp , Pokhara, Nepal; 4: K E M Hospital, Bombay, India

A recent study reports that leprous facial neuropathy is located at the main trunk close to the first bifurcation and that the disease may indeed develop fusiform swellings *(Plast Reconstr Surg-accepted 1998)*. These findings stay in contrast to Antia's study (1966) in which the disease is described to exclusively affect the nerves peripheral zygomatic branches, but also confirm two previous reports which had expressed valid doubts about the solely peripheral localization of the disease. Based on these observations, we assumed that Antia's and our findings might be rather complementary than contradictory, and hypothesized that leprosy affects the seventh cranial nerve in a scattered way. This would mean that the -presumed- *undetected proximal involvement* of Antia's eleven leprous facial nerves (1966) had not been recognized due to their *incidentally* inconspicuous aspect at the main trunk.

To clarify this hypothesis, we decided to repeat Antia's study: facial nerves of 10 leprosy patients missing sufficient motor improvement after completion of their WHO-medication were first exposed at the main trunk; after evaluation of their macroscopically aspect, the functional status was investigated with intraoperative electroneurodiagnostics; all 10 nerves showed a lesion at the the first bifurcation; subsequent lateral parotidectomy revealed further lesions more farther distally, with all peripheral branches to be irregularly involved in a scattered way. Epineuriotomy showed various degrees of fibrosis of the epi-and interfascicular epineurium. Histopathological probes from the epifascicular epineurium confirmed these findings.

We conclude that 1) leprosy affects facial nerves in a scattered way from the main trunk to all peripheral branches 2) intraoperative electroneurodiagnostics is an effective means to detect the site and most proximal involvement of leprous facial neuropathy.

SU05

RESULTS OF TEMPORALIS MUSCLE TRANSFER PROCEDURE FOR CORRECTION OF LAGOPHTHALMOS

Dr. D.Vijayakumar, Dr. Helen G. Roberts
Premananda Memorial Leprosy Hospital
259/A, A.P.C. Road, Calcutta 700 006, India

Lagophthalmos in Leprosy patients can be corrected by Temporalis Muscle Transfer using palmaris longus or fascia lata as a graft tendon. 28 of the patients underwent such procedure using Modified procedure of JOHNSON'S TECHNIQUE during the period between 1995 - 1997.

The post - operative evaluation of these patients will be presented with relation to gap corneal pathology, vision, cosmetic effect, watering etc. The modified procedure gives good cosmetic appearance and good visual Rehabilitation.

SU06

INTRAOCULAR LENS IMPLANTATION IN LEPROSY PATIENTS

Shyamala Anand, Sunil Anand, G Rajan Babu, C S Walter
The Leprosy Mission, Kothara, Po Paratwada, Dt Amravati, Maharashtra - 444 805, India

Leprosy affected people like everyone else, develop cataracts due to various factors-age, diabetes, oral steroid therapy, ocular trauma, chronic ocular inflammation - to name a few. This study reviews our experience with intraocular lens (IOL) implantation in 126 eyes of 104 leprosy affected patients over 2 1/2 years. The purpose of this study is to analyse the visual outcome of the surgeries, to determine the etiology of cataracts in these patients, to determine the effect of pre-existent ocular disease if any, on the outcome of the surgeries, to determine whether the visual outcome of the surgery was affected by the type of leprosy, smear positivity or ongoing anti-leprosy treatment and to analyse the post-operative complications. The study concludes that IOL implantation offers the best form of visual rehabilitation for leprosy affected patients when they develop cataracts as it gives very good visual results. The surgery is associated with very few post-operative complications when cataracts are age related. Cases with past history of iridocyclitis however were associated with more intra and post operative complications. Smear positivity, type of leprosy and anti-leprosy treatment have little effect on the visual outcome of the surgery.

SU07

ABSTRACT EYEBROWS RECONSTRUCTION BY TRANSPLANTATION OF MULTIPLE PUNCH SCALP GRAFTS

Aldemar Vilela de Castro, Monica Maakaroun, João Afonso Moreira Neto and Maria de Lourdes V Rodrigues

Medical School of Ribeirão Preto/São Paulo University, Sanatorio Santa Izabel, Belo Horizonte, Brazil

Leprosy remains a serious health problem in Brazil. The social stigma attached to the disease is strong and visible deformities may prevent the patients' adequate rehabilitation. Loss of eyebrows (madarosis) is a well recognised although pathognomonic sign of leprosy; it's very frequent, bilateral and permanent. In this study, the missing eyebrows were reconstucted by transplantation of multiple punch full thickness scalp grafts. The cosmetic results were observed on 17 patients, 8 months after each operation. Of the 34 reconstructed eyebrows 22(64.70%) looked good, 6(17.65%) looked acceptable and 6(17.65%) looked poor. The cosmetic appearence was considered satisfactory in 14(82.35%) patients and unsatisfactory in 3(17.65%) patients. The full thickness scalp grafts showed a successful take to the recipient sites and the technique proved to be simple, safe, eficient and didn't lead to any important complication. These advantages assure the possibility of eyebrows reconstruction in a large number of leprosy patients, helping their rehabilitation and reintegration in normal society.

SU08

Title : SURGICAL CORRECTION OF LAGOPTHALMOS BY TEMPORALIS MUSCLE TRANSFER IN HANSENS DISEASE.

Authors : Dr.M.K.Siddalinga Swamy, Dr.K.S.Rao
Central Institute of Orthopaedics,
Safdarjang Hospital,
New Delhi-29. (India)

Abstract: Leprosy is known for the deformities it causes due to involvement of nerves. Temporal branch of facial nerve is commonly involved resulting in Lagopthalmos. If conservative treatment fails surgery has to be done to prevent eye complications like exposure Keratitis, Iridocyclities. During the period from 1987 to 1994 44 Lagopthalmos were corrected by temporalis muscle transfer using a free graft. Most of the cases belong to boderline tuberculoid leprosy. Duration of paralysis varied from 8 months to 20 years, age of the patient varied from 30-60 years. 32 were males and 10 were females. Two patients underwent bilateral correction. Follow up of the patients varied from 1 year to 4 years with an average of 2.5 years. Corrections were satisfactory in 42 cases and failed in two cases due to adhesions. There were complications in 3 patients namely, tight band, corneal injury, and conjunctivitis which were corrected. Spontaneous blinking was present in most of the patients and the eyes remained closed during sleep.

SU09

TWO METHODS FOR INTRINSIC REPLACEMENT OF THE LEPROSY HAND; A COMPARISON OF HAND FUNCTION

Roland Kazen, Catherine Benbow, Asrat Mengiste, Yesabnech Abate, Fikre Mekuria Chachu, Philippe Thevoz

ALERT, P.O.Box 165, Addis Ababa, Ethiopia

Methods for intrinsic replacement (Ulnar paralysis) of the hand in leprosy have limitations as to applicability and effect on hand function. Intrinsic replacement procedures do not essentially improve the metacarpal arch. Some procedures even exaggerate the arch deformation. Correction of the metacarpal arch is seldom performed. Only one method corrects the metacarpal arch at the same time as stabilising the metacarpophalangeal joints.

The aim of this study is to compare the immediate impact on hand function of two methods for intrinsic replacement, the *Superficialis Pulley Insertion (Zankolli)* and the *Intrinsic Reactivation (Palande)*. A phase of long term follow up will be added later on.

A test battery for hand function has been developed taking into account the effect of an improvement of the metacarpal arch, measuring *impairment, disability* and *personal assessment of hand problems.*

Patients with mobile clawhands, with or without an additional median paralysis, are alternatively chosen for one of the procedures. For pre- and post-operative assessments the new test battery is used, including a new assessment method for the metacarpal arch. Results are compared.

SU10

ADDUCTOR REPLACEMENT FOR THUMB BY TRANSFER OF HALF-INDEX SUBLIMIS TENDON

Dr.P.K.Oommen and Dr.V.Durai
Central Leprosy Teaching & Research Institute, Chengalpattu - 603 001, Tamil Nadu, India.

In Hansen's disease paralysis of the ulnar nerve resulting in claw deformity of fingers and Z-deformity of thumb on attempted pinch is the most common deformities seen. Though surgical correction of the fingers in done the thumb is very often neglected, even in a median involvement. In the latter an abductor opponens plasty is done to correct claw thumb but the ulnar paralysis of thumb due to paralysis of adductor and part F.P.B., is often ignored. We have used half-index sublimis transfer as adductor replacement routing the sublimis along the course of the adductor and attaching it at the adductor insertion, to correct the Z-deformity and produce an effective pinch and found the results satisfactory. Importance of the adductor, details of the operation and results in 25 patients who had half-index sublimis as adductor replacement is presented in this paper.

SU11

POSTERIOR TIBIAL NERVE DECOMPRESSION IN PREVENTION OF PLANTAR ULCER

I.L.E.P. PTND Multicentric Study Group, India

This is a study to determine whether Posterior Tibial Nerve Decompression (PTND) will prevent recurrence of plantar ulcer. It involves 7 centres in India with 246 feet (233 patients) having one or two scars of the healed plantar ulcers and sensory impairment on the plantar surface. Allocation of individual feet was done on random basis to PTND + foot care and foot care alone. Comparability of feet for the relevant factors in the 2 groups was ascertained. Total duration of follow-up was 3 years with six-monthly examinations. Patients were also to report as and when ulceration of foot occurred. Follow-up was completed by 31st January 1998. Interim analysis was done for the data available till August 1997. It reveals that coverages for 1st to 6th follow-up examinations were 94%, 92%, 87%, 86%, 79% and 78%. Variation in recurrence rates for plantar ulcerations for the different centres in the two groups were within acceptable limits. (Analysis of variance with Arc sine transformation and weighting, between centres $F = 3.32$, $p = 0.08$). Overall recurrence rates were 39.5% and 36.9% for PTND + foot care and for foot care alone, and were very similar (Mantel-Haenszel Summary $\chi^2 = 0.06$, $p = 0.80$, Mantel-Haenszel weighted relative risk = 0.94). Various factors related to patients were considered to understand the reasons for this no difference and none was found to be significant. Sensory status (improvement or worsening) was similar in both the groups at the end of 4th follow-up. Healing time for the recurrent ulcers was also similar in the two groups.

Thus, PTND did not prevent recurrence of plantar ulcers, under the conditions of this study. Final results from the study will be presented.

SU12

FLAP REPAIR FOR PLANTAR ULCERS OF LEPROSY

Chong-zu Qian, Jin-hua Chen, Jian-ge Qian, Ai-ru Yu, Jian-jun Yao and Yong-gang Jin
Zhejiang Provincial Institute of Dermatology, Deqing Town, Wukang County
Zhejiang Province, China

The authors performed flap repair on 45 leprosy patients (35 males and 10 females) with plantar ulcers from 1982 to 1995. The patients' age ranged from 24 to 66 years. Of them 4 were active cases (MB) and 41 cured persons affected by leprosy (MB 25 and PB 16). As regards of the sites of ulcer, there were 6 in heel, 8 in lateral plantar, 2 in medial plantar, 5 in the first metatarsal head, 12 in the 2nd - 5th metatarsal head, 1 in big toe, 2 in medial ankle, 3 in lateral ankle, 4 in lower third of leg and 2 with forefoot defect. Subdermal vascular network skin flap had been used in 5 cases, local pedicled flap in 8, muscular in 12, composite tissue flap in 6, free flap in one, island flap in 8 and reverse island flap in 5. Fourty flaps totally survived (but 2 with partial margin necrosis) and 5 failed to survive. The survival rate of flag was 90%. In the follow-up period of 112 years, all flap-survived cases were satisfied with the results functionaly and cosmetically, but blisters occurred in 6 cases in the early stage of weight-bearing. The authors suggested that various kinds of flaps could be used in repairing plantar ulcers of leprosy by experienced surgions, but the flaps used in this study could not solve the problem of insensitivity of the foot. Self care education and protective footwear should be carried out and provided.

SU13

HEEL ULCERS IN LEPROSY TREATED WITH A FASCIO-CUTANEOUS ISLAND FLAP FROM THE INSTEP OF THE SOLE: 10 YEARS EXPERIENCE.

Paul Egil Gravem, Asrat Mengiste, Roland Kazen, Ibrahim M. Hassen
ALERT, P.O.Box 165, Addis Ababa, Ethiopia

Feet with heel ulcers, with major soft tissue loss, and often complicated by osteitis of the calcaneum, have seldom been successfully restored with conventional transposition flaps. Attempts using tissue from outside the glabrous skin area have shown high failure rates. Below knee amputation has often been the final outcome in the past.

In 1991, ALERT (P.E. Gravem) published preliminary results of reconstruction with a transposed fascio-cutaneous island flap from the instep, performed on 23 leprosy patients. The observation time was up to two years. We now review all patients operated on with this technique from 1986 onwards, including the patients from the first study. The observation time is up to 10 years.

The results are very encouraging and we feel this procedure should be recommended as a standard method for heel reconstruction in most cases where there is major soft tissue loss. Surgeons with some experience in basic plastic surgical principles should be able to perform the operation safely. The operation should become part of the surgical menu in major referral centres for leprosy patients. However, the operation is a relatively complicated plastic surgical procedure, and the technical hazard should not be underestimated.

The method will be presented in detail together with short and long term follow up results of the patients.

SU14

THE DEFORMED FOOT: THE PLACE OF CORRECTIVE SURGERY. A 12 YEAR REVIEW.

Mark Macdonald, Richard Schwarz; Anandaban Leprosy Hospital P.O. Box 151 Kathmandu.

The anaesthetic foot in leprosy can lead to recurrent ulcer formation and neuropathic disintegration of the foot, resulting in marked deformity and disability. Corrective osteotomy/arthrodesis, attempts to restore a more functional anatomical position leading to decreased impairment.

We present a retrospective review of major corrective foot surgery, performed at Anandaban on 49 patients (55 procedures) over a 12 year period. The commonest procedure was ankle joint fusion (51%) followed by combined ankle and sub-talar fusion (24%). Union occurred in greater then 95% of patients. A positive outcome was found in 84% of those with recurrent ulcers with a low amputation and failure of fusion rate.(7%)

The role of corrective surgery as a salvage procedure in the deformed foot as an alternative to amputation is established.

SU15

A FUNCTIONAL HAND ASSESSMENT

Philippe Thevoz, Catherine Benbow, Roland Kazen
ALERT, P.O.Box 165, Addis Ababa, Ethiopia

Objective: To develop a reliable and valid hand assessment battery to evaluate the results of surgical correction in the hand affected by leprosy.

Design: The assessment is made up of 3 components:
1. Impairment (muscle, sensory and range of motion testing)
2. Disability (qualitative and quantitative functional tests)
3. Subjective assessment of hand problems

Method: Standardized tests were selected for the assessment of impairment. Functional tests were developed to measure disability. A short questionnaire was designed to record the patient's opinions of the difficulties experienced in daily life. 13 normal people, 15 pre-op and 15 post-op were each assessed by two out of three randomly assigned assessors.

Results: *Inter-observer reliability*
Close agreement between pairs of observers was achieved for impairment in 97.5%, for disability in 82.4% and for the subjective assessment in 77.5%.

Validity
1. Spearman's Rank Correlation Coefficient (r_s) was 0.90 for the correlation between standardized scores of impairment and the non-standardized test results for disability. $r_s = 0.79$ for the correlation between impairment and subjective assessment.
2. Although the pre- and post-operative groups were different cohorts, the mean values of the impairment, disability and subjective assessment scores show improvement of 8% for impairment, 24% for disability and 55% for subjective assessment.

Conclusion: This hand assessment battery can be used to evaluate the results of surgical correction.

SU16

THERAPEUTIC SURGERY FOR LEPROSY PATIENTS PERFORMED IN MANAUS, STATE OF AMAZONAS, BRAZIL.

Pedro Aurelio Leite Cunha, Marcus Vinicius Monteiro Alves, Maria Anete Queiroz de Moraes, Elbio Correa Rola, José Yranir do Nascimento.

Instituto de Dermatologia Tropical e Venereologia "Alfredo da Matta"
Rua Codajás, 24 - Cachoeirinha
Manaus - Amazonas - Brasil - 69065-130

The high affinity of M. leprosy for peripheral nerves is the key to the association between leprosy and disability. Besides the invasion of nerves by M. leprosy, resulting in inflammation with the consequent possibility of nerve damage, the pathogenesis of nerve destruction is closely linked with leprosy reactions and most of nerve damage occurs during reaction.

This prospective study examines the outcome of therapeutic surgery, mainly nerve decompression, for leprosy patients suffering the effects of chronic neuritis. From January to December 1996, 138 leprosy patients were included in the study; all the patients except 12 of them, had taken prednisone 1mg/kg/day. The pre operative selection of patients was by pain or thickness of the nerve with the presence of anesthesia of hands or feet combined with muscle weakness, and the failure to improve the patient clinical condition by steroids treatment alone.

Detailed voluntary muscle testing (VMT) and sensibility testing (ST) was done before and each 3 months after nerve decompression, during 1 year, on 126 cases of the total included. Based on patients information all of them except 5 showed lack of spontaneous pain and no one claimed to feel worse. All patients but 19 showed improvement in protective sensation; two patients showed to feel worse. All patients but 25 had informed muscle strengthening during recovery. These results when compared with those obtained from VMT and ST testing were similar.

In this essay the optimum time for nerve release, the more adequate surgical procedure and the patient progress have been discussed. The procedures were simple and quick, not required general anesthesia, hospitalization and there were no relevant complication. It has shown that neurolysis have had encouraging results.

SU17

PLASTIC AND RECONSTRUCTIVE SURGERY IN THE TREATMENT OF PLANTAR ULCERATION OF LEPROSY: PRINCIPIE AND PRACTICE

Li-wen Dong *, Fu-tian Li*, Zai-ming Wang*, Juan Jiang #, Guo-cheng Zhang#, Ju-gen Zhang+ and Yong-liang Ye+
* Shanghai Zunyi Hospital, Shanhai, China.
# Institutte of Dermatology, CAMS and PUMC, Nanjing City
+ Wu County for Skin Diseases Control, Suzhou City

Since early 70's, the authors have employed microscopic surgical technique to reconstruct the plantar ulceration with 8 types of the flaps in 76 leprosy patients. Postoperatively, all the flaps survived, and the long term curative effects were proved satisfactory through our follow-up. Because of the neurovascular malnutrition in some patients who suffered from complete drop feet resulting from the damage of common peroneal nerve and high part of the tibial nerve, the osseous healing rate by the routine procedure of joint fushion was low. To avoid this problem, the authors have designed and used free fibula graft based on the fibular artery pedicle for ankle joint fushion. Postoperaturely, the osseous healing situation appeared sound.

SU18

SURGICAL EXPERIENCE IN OCULAR LEPROSY

This paper deals with our experience in various intraocular operations done in leprosy patients over a period of 15 years.

The intraocular operations done are
1. Cataract extraction with or without I.O.L.
2. Phaco Emulsification
3. Trabeculectomy
4. Combined extraction
5. Extraction with vitrectomy.

The aim of the presentation is to highlight the likely complications and precautions to be taken before and after surgery in these patients as they have less corneal sensations, weakness of the orbicularis oculi. They have very less symptoms for the post operative complications.

PROBLEMS WE FACE WITH THEM :

- Reduced nucin content in tear film
- Reduced corneal sensation
- Cannot feel the injury or foreign body
- Weakness of the orbicularis
- Rubbing with infected hands
- Minimal symptoms.

This paper will be presented with Slides.

SU19

TOTAL INTRAVENOUS ANAESTHESIA (TIVA) FOR INTRAOPERATIVE ELECTRONEURODIAGNOSTICS (IOE) AND TIME CONSUMING NEUROLYSIS OF PERIPHERAL NERVES AFFECTED BY LEPROSY

E. Knolle[1], E. Turkof[2], R. Ciovica[2], B. Katri[3], B. Richard[3].

1: Dept Anaesthesia-B 2: Dept Plast Reconstr Surg, Vienna-Univ.Clinic, Austria
3: Green Pasture Leprosy Hospital, Pokhara, Nepal

Intraoperative electroneurodiagnostics during surgery of leprous nerves require full relaxation of patients and extensive interventions lasting several hours. We report about the specifics of 19 general anaesthesias performed on leprous patients in the Green Pasture Leprosy Hospital, Pokhara-Nepal.

For intubation all patients were relaxed with small bolus of vecuronium 0.5-1 mg/kg. For surgery of leprous facial nerves 9 patients (I) were anaesthetised with continuous infusion of propofol alone (5-10 mg/kg/hr). 8 patients scheduled for tibial nerve surgery and 1 patient for surgery of both nerves received at first continuous infusion of ketamine (1-2 mg/kg/hr) followed by propofol after performing IOE (II). Intraoperative pain treatment was performed with fentanyl (0.05-0.1 mg). For ventilation a positive-pressure respirator (East Healthcare, Oxford) in a half-open system was used. Oxygene was administered only during induction and at the end of anaesthesia. ECG, oxygene-saturation (criticare) and blood pressure were continuously monitored. We registered the time between end of infusion and the moment when patients were able for verbal reaction (waking time) and the occurence of vomiting and confusion during the following 24 hours.

	operating time	fentanyl amount	waking time	number of patients	
				vomiting	confused
I	390 Min (430,270)	0.45 mg (0.5,0.0)	20 Min (25,10)	0	0
II	400 Min (610,280)	0.5 mg (0.5,0.0)	20 Min (50,10)	2	3

Median (Max,Min)

Both TIVA-regimes produced adequate anaesthesia for the operating procedures, they did not require more than 0.5 mg of fentanyl and the waking time was similar. The analgetic properties of ketamine was sufficient for the extended skin incision in tibial surgery.

SU20

NURSING CARE OF PRE-AND POST-SURGICAL CORRECTION OF FOOTDROP IN LEPROSY

Xiu-hua Lin
Instructor: Zhi-lin Jiang
Fujian Provincial Hospital for Skin Diseases Control, Fuzhou City, China

Transfer of post-tibial muscle tendon for correcting footdrop has been extensively used in leprosy patients usually with satisfactory results. However, the pre- and post-surgical care will distinctively influence its results. Twenty-one feet in 21 male patients with footdrop including 3 with plantar ulcers received above mentioned surgical procedure. At the same time, the authors provided them with nursing care of best quality. Before the operation, they were asked to learn how to do the functional exercise of posterior tibial muscle by themselves, and after the operation they exercised gradually and practiced their gait until had the gait corrected. Patients were followed up for 3 months when the plaster had been removed. The results should that: 1) three plantar ulcers all healed without reoccurrence; 2) nineteen patients had a correct gait; 3) two patients still had a mild steppage gait due to old age and insufficient exercise; 4) angle of every foot in an active dorsiflexion was less than 85 ° and in an active plantar flexion reached 100-110 ° . The authors suggested that footdrop patients complicated with plantar ulcers could be given the treatment of transfer of post-tibial muscle tendon if they could be well managed.

SU21

ABSTRACT EXTRACAPSULAR CATARACT EXTRACTION AND INTRAOCULAR LENS IMPLANTATION IN LEPROSY PATIENTS VISUAL OUTCOME AND COMPLICATIONS

Gretchen Batistella, Monica Maakaroun and Aldemar Vilela de Castro

Leprosy Department of Hospital São Geraldo, Sanatório Santa Izabel, Belo Horizonte, Brazil

In Belo Horizonte, Brazil, 55 leprosy patients of all clinical types and grades (70 eyes) underwent extracapsular cataract extraction and intraocular lens implantation during a period of 4 years. The authors analysed the visual outcome and complications of these surgeries. The visual acuity improved in 92.9% of the eyes and in 65.7% the acuity improved by 4 lines or more on the Snellen chart. 39 eyes (55.7%) had at least one of the following postoperative complications: astigmatism 2 (3.0%), inflammation 13 (18.6%), synechiae 7 (10.1%), sphincter tears 19 (27.2%), debris adherent to lens surface 11 (15.8%), dislocation of the IOL to anterior chamber 1 (1.5%), descentration of the lens 7 (10.1%), opacification of posterior capsule with loss of visual acuity 22 (31.5%). YAG capsulotomy was performed to restore the vision in 18 (25.7%) of these eyes.The postoperative complications were not too serious and could be controlled; most of them couldn't be associated to leprosy infiltration only.

SU22

PUNCH GRAFTING IN NON-HEALING TROPHIC ULCERS IN LEPROSY.

Dr. S. K. Tripathi, Dr. R. N. Mishra, Prof. Dr. A. K. Jha Amar
Skin Institute, Makhania Kuan, Patna.

Trophic ulceration is the consequence of repeated trauma, deformity and bone damage in anaesthetised limb. In many cases it could be a constant source of agony and embarassment even after patient is cured. Punch grafting is very useful technique which promotes complete healing of the ulcer in most cases.

21 cases of non-healing trophic ulcers were selected after completion of regular MDT. Multiple 6 mm punches were grafted after debridement of the floor. Tight dressing applied. Dressings removed after 7 days.

More than 90% of grafts were taken-up in 17 cases (80.9%) after 7 days and healed subsequently. In 4 cases grafts were rejected leaving a healthy granulating base with partial healing of ulcer. These were regrafted and healed uneventfully. Stitching done at donor site in all cases.

Punch grafting is very useful, simple, inexpensive and least aggressive surgical procedure for non-healing trophic ulcers in leprosy.

SU23

SURGICAL CORRECTION OF THUMB OF MEDIAN AND ULNAR PARALYSIS

LONG TERM COMPARATIVE FOLLOW-UP STUDY IN 111 HANDS

T.S.NARAYANAKUMAR

SACRED HEART LEPROSY CENTRE, KUMBAKONAM, SOUTH INDIA.

The commenest cause of deformity of thumb in leprosy is median and ulnar paralysis. Surgical abductor-rotator replacement is done by transfering Extensor Indicis Proprious or Flexor Digitorum Superficialis or Palmaris Longus as motor. The often associated metacarpophalangeal instability is corrected by using the same motor used for abductor-rotator replacement with double insertion or by using a seperate tendon.

During the ten year perioa from 1979 to 1989, 111 patients with thumb deformity aged between 13 and 61 and paralysis of one year to twenty years duration underwent surgical correction at this centre and were followed up for periods ranging from 1 year to 15.5 years (mean 7.29 Years).

The results of abductor-rotator reconstruction by different procedures were evaluated using active abduction and rotation of the thumb and ability to perform pinch as parameters. They were compared and advantages and disadvantages of different procedures were discussed. The results of different procedures for metacarpophalangeal stabilisation were also analysed, compared and discussed.

SU24

THE RESTORATION OF PROTECTIVE SENSIBILITY IN THE HAND BY DIGITAL NERVE TRANSLOCATION

Türker Özkan, Ayan Gülgönen, Ayşe Yüksel, Hatice Erdoğan, Türkan Saylan
Istanbul Leprosy Hospital, Bakirköy, 34747, and Istanbul Medical Faculty, Hand Surgery Department, Capa, 34390, Istanbul, Turkey

All techniques used for correction of traumatic paralysis give the same result in leprosy paralysis. But the leprotic hand also involves loss of sensation. Therefore, it is of great importance to reconstruct the motor nerve function of the hand together with protective sensitivity.

In this study loss of motor function and sensibility are regarded as components of a complex event. During restoration of motor function, translocation of functional digital nerves which

innervate relatively less important areas of sensibility to nonfunctional digital nerves are performed in order to restore at least a protective sensibility in these otherwise anesthetic regions.

20 cases were operated between 1985 and 1994 (18 male, 2 female). The patients age ranged from 13 to 42 years. Our first case was a leprosy patient. Four cases emergency, 11 delayed cases of traumatic nerve legions, 5 leprosy patients. 12 cases had N. ulnaris, 6 cases N. medianus, 1 case N. medianus+N. ulnaris, 1 case N. medianus+ N. radialis lesions.

The duration of paralysis ranged from 1 day in emergency cases to 20 years.

Postoperative follow-up ranged from 28 months to 119 months. The return of functional sensation was evaluated by FSR described by Tenny and Lewis, and BMRC classical sensation improvement rating. Subjective results were evaluated by use of 100 point scala of classic 6 questions prepared by Lewis.

FSR result were 10% very good, 40% fair, 10% poor; BMRC sensational improvement was 10% S3+, 30% S3, 40% S2, 10% S1; and subjective evaluation results were 10% very good, 60% good, 20% fair, 10% poor.

Digital nerve translocation can be chosen in selected cases, in addition to the motor function reconstruction procedures for its easy application, dependability and sufficient results.

SU25

FLEXOR APONEUROTIC RELEASE FOR RESISTANT ADAPTIVE SHORTENING OF LONG FLEXORS IN CLAW HANDS IN LEPROSY.

Santosh Rath

LEPRA - HOINA Reconstructive Surgery Unit, Muniguda, Orissa, India.

Adaptive shortening of long flexors (ASLF) occurs in long standing neglected claw deformity of hands in Leprosy. The inability to completely extend the proximal interphalangeal joint initiates shortening of the long digit flexors, mostly of the flexor digitorum superficialis. ASLF is classifed as mild, moderate and severe when PIP angles are present with wrist in 30° extension, neutral and 30° flexion respectively. Gentle passive stretching along with serial digital casting and night splinting is routinely instituted for all ASLF and on full correction splintage is discarded for two weeks prior to tendon transfer. Flexor aponeurotic release (FAR) is considered for 1) resistant ASLF despite adequate physical therapy for 6 weeks 2) persisting swelling of PIP joints 3) pain during gentle stretching 4) reduction of grip power during therapy and 5) recurrence of ASLF after discarding splintage. FAR consists of excising a 3-4 cms wide flap of deep fascia along with inter-muscular septum and fibrous bands of flexor origin in upper forearm. In 12 patients ASLF was corrected by FAR peroperatively and tendon transfer was done 4 weeks later. The procedure of FAR for resistant ASLF, its indications, clinical results and its advantages will be presented.

SU26

CATARACT SURGERY IN PAL'S— CALCUTTA EXPERIENCE

Dr. Helen G. Roberts
Premananda Memorial Leprosy Hospital
259/A A.P.C. Road, Calcutta 700 006, India

36 Eyes of 28 Leprosy patients underwent Cataract surgery at Premananda Memorial Leprosy Hospital in year 1997. About 40 percent of these eyes were implanted with intra ocular lenses. 92 percent of these patients had Multi-bacillary leprosy. 27 percent of these patients were smear positive at the time of surgery. 75 percent of these eyes were blind i.e. vision < 1/60 and 25 percent of the eyes were severe visually impaired i.e. vision <6/60. 90 percent of the eyes were restored to vision >6/18. Success Rate and the Sight Restoration Rate in these patients will be presented.

In conclusion, quality vision can be given to PAL's following Cataract surgery with Intra ocular lens implantation.

SU27

CORRECTION OF FOOT DROP IN LEPROSY BY TIBIALIS POSTERIOR TRANSFER

Sanjay Sane, J. M. Mehta

Dr. Bandorawalla Leprosy Hospital, Kondhwa, Pune 411 048, Maharashtra, India.

Paralysis of the anterolateral group of muscle of the leg resulting in Foot drop is one of the major factors contributing to the lower limb morbidity in the patients of Hansen's disease.

The Foot drop compells the patient to walk with a 'high stepping gait' subjecting the forefoot and the lateral border to high pressures resulting in trophic ulcerations. In established cases, reconstructive surgery is the only definitive means to correct the drop foot and entails the use of Tibialis Posterior muscle and rerouting it on the anterior aspect of the ankle to function as a dorsiflexor.

This study was done at Dr. Bandorawalla Leprosy Hospital, Pune 48. Fiftytwo patients were studied. Cases were predominently males and ranged from 18 to 45 years. Apart from details of surgical technique, emphasis has been laid on the importance of Biomechanical factors and Podiatric factors which must be looked into in obtaining an evenly weight bearing foot and providing a good ground clearance. Details of pre operative and post operative physiotherapy and role of footwear modifications in the functioning of the operated foot is also stressed.

SU28

NEWER DIMENSIONS IN TISSUE COVER FOR PLANTAR ULCERS

Atul Shah

Comprehensive Leprosy Care Projects, Ciba Compound, Tardeo, Mumbai, India.

The understanding of tissue deficit in the specialised skin of the sole of the foot is necessary for management of chronic plantar ulcers in leprosy feet. Author has devised the neurovascular subcutaneous island pedicle flap for forefoot ulcer, the distally based transposition flap for metatarsal head ulcers, the inferiorly based flap (with or without muscular component) for heel ulcers to provide for issue deficit. The techniques, follow-up and long term results will be presented for a series of cases.

SU29

INTRAOPERATIVE ELECTRONEURODIAGNOSTICS IN PERIPHERAL NERVES AFFECTED BY LEPROSY: TECHNIQUES, IMPLEMENTATION AND LIMITATIONS

E. Turkof[1], B. Richard[2], M. El-Dahrawi[3], R. Ciovica[1], S. Kamal[3], S.Tambwekar[4]

1: Dept. Plast. Reconstruc. Surg., Univ.Clinic of Vienna, Austria;
2: Green-Pasture Leprosy Hospital, Pokhara, Nepal;
3: Kasr-El-Aini Univ. Hospital, Cairo, Egypt
4: K.E.M. Univ. Hospital, Bombay, India

Leprous nerves are affected in various ways according to the type of disease, duration of disease and the characteristics of the nerves. If surgery is to be performed in leprous neuropathy, it is crucial to release all affected segments to ensure effective interventions. Conventional nerve conduction velocity studies (NCV) are commonly performed preoperatively to verify the clinics and to determine the site of lesion. However, these routine techniques are limited in two

ways: the proximal extend of lesion cannot be detected and a second affected site in case of scattered lesions (median nerves, tibial nerves) would not be identified. Furthermore, measurements would be impaired if the common stimulation site is affected as well, which frequently is the case (distal upper arm/ulnar nerve, cubital region/median nerve, fibular head/peroneal nerve, popliteal region/tibial nerve). In contrast, with intraoperative electroneurodiagnostics nerves are stimulated at the most proximal possible and unaffected site of the nerve, the roots. This enables a precise localization of the disease's proximal extend.

Since five years, intraoperative electroneurodiagnostics have been performed on leprous nerves during several international pilot studies (Bombay-India/1992+1994; Cairo-Egypt/1995; Pokhara-Nepal/1996+1997). In limb nerves, spinal root were electrically stimulated with surface electrodes, in facial nerves their exit at the pontal region were stimulated with needle electrodes over the temporal region. Efferent nerve compound action potentials were registered from the nerve's surface with bipolar wire electrodes moved proximally and distally along the exposed segments. Patient were fully relaxed to avoid volume conduction.

We report about our experience from over 2000 intraoperative recordings with various techniques, the implementation of the different methods, the interpretations of results and the limitation of the techniques.

SU30

MICROSURGICAL INTERFASCICULAR NEUROLYSIS OF THE MAIN TRUNK AND ALL AFFECTED PERIPHERAL BRANCHES OF LEPROUS FACIAL NERVES CAN AVOID TRANSFER PROCEDURES

E. Turkof[1], B. Richard[2], E. Knolle[3], B. Katri[2], R. Ciovica[1], S.Tambwekar[4]

1: Dept Plast Reconstr Surg 3: Dept Anaesthesia-B, Vienna-Univ Clinic, Austria
2: Green Pasture Hosp., Pokhara, Nepal 4: K.E.M. Hospital, Bombay, India

Since 1966, musculofascial transfer procedures remain the only surgical treatment of leprous facial neuropathy. The goal of this study was to evaluate the possible benefit of invasive neurolysis in leprous facial neuropathy given the fact that the surgeon can reliably detect all affected nerve segments.

10 patients suffering from leprous facial neuropathy were enrolled in this international prospective pilot study. All patients were medically treated according to WHO recommendations and had undergone clinical and electrophysiological investigation prior to surgery. Interventions consisted of exposing facial nerves at the main trunk and to perform lateral parotidectomy. Subsequently, all affected nerve segments identified as such either by intraoperative electroneurodiagnostics and/or by their macroscopical and microscopical aspect were surgically treated by epineuriotomy and, if necessary, by microsurgical, interfascicular neurolysis.

Follow up was performed 10 months and 22 months after surgery. Despite the fact that patients represented a negative selection as far as duration and severity of the disease was concerned, clinical evaluation showed improvement of lagophtalmos and/or other functions of facial muscles in all but one patient.

We conclude that microsurgical interfascicular neurolysis, properly performed on all affected nerve segments, can be recommended in leprous facial neuropathy and can avoid transfer procedures.

TRAINING

TR01

METHODS OF TRAINING BASIC HEALTH WORKERS AND PATIENTS IN PREVENTION OF DISABILTY

P D Samson, Wong ML, Zhang Guocheng, J Jiang, J Watson, A Piefer, R Winslow, WCS Smith. Ministry of Health, Peoples Republic of China, The Leprosy Mission International, 08-06 Golden Mile Tower, 6001 Beach Road, Singapore 199589.

The prevention of disability project in the People's Republic of China is probably the largest project in the world addressing the problem of prevention of disabilities due to leprosy. Disabilities have been the major cause of social stigma in leprosy patients in China and present major hurdles in their rehabilitation.

We have implemented the Prevention of Disability (POD) programme of leprosy patients in 15 provinces in China which has involved the planning and implementation of training of both health workers and people affected by leprosy in self care. The methods of training used at National, Provincial and County levels have included lectures, group seminars, demonstrations and on the job training. Training to the health staff i.e doctors, supervisors and basic health workers was the key to the programme's success. A total of 325 training courses were conducted and a total of 11,891 participants were present. 2,078 supervisors were also trained in this programme. The programme involved the process of transferring POD technology from experts to basic health workers to leprosy patients. However the follow-up surpervision and re-inforcement of training has been a key to the success of the programme.

Evaluation of the achievements of the training programme was conducted by a independent team of national and international experts in 1998. Change in attitudes and behaviour of the patients to the problem was assessed. The response of patients to neuritis was good and patients followed the instructions careful, particularly if there was pain associated with the neuritis. Patients learned self care of eyes well, partly because eye problems are visible and closely linked to stigma. Self care of the hand was comparatively better than self care of the foot which may be related to function of the hand and visibility.

The evaluation of the effectiveness of training reflects on the importance of follow up supervision and reinforcement of training; and patients learning related to presence of pain and the visibility of the potential disability (deformity).

TR02

BASIC ACTIVITIES AND SKILLS DETERMINED IMPORTANT IN PREVENTING IMPAIRMENTS AND DISABILITY IN HD AND THEIR IMPACT ON TRAINING AND SUPERVISION IN BRAZIL IN 1997 AND 1998

Linda F. Lehman, Hannelore Vieth, Maria Beatriz P. Orsini, Maria Leide W. Oliveira

National Coordination of Sanitary Dermatology (CNDS), National Health Foundation, Ministry of Health, Brasilia, D.F., Brazil
American Leprosy Missions (ALM), Greenville, S.C., USA

Brazil has 27 states and over 5,000 municipalities. It continues to have over 36,000 new cases of HD diagnosed yearly. The coordinator of CNDS of the Ministry of Health in Brazil requested a collaborative National Prevention of Disability (POD) Project between the government and ALM in August of 1996. One outcome expected was to integrate essential POD activities into all HD control programs. Therefore is was necessary to identify essential activities and skills needed for preventing impairments and disability.

A consensus of basic activities and skills were developed by the National POD advisory committee combined with the results from four 1997 national supervisory training workshops. The combination represented disease control realities throughout Brazil.

Using these activities and skills, standardized training courses and systematic supervision were developed and implementation started in 1997. This presentation will also show the course content and objectives of two standardized training courses. One course developed for the trainer/supervisor and the other course for local health care workers. The skills learned in the courses are than followed up in systematic supervision activities. Supervision was felt to be the key component to maintaining and improving quality care as well as key to giving feedback for future training needs.

TR03

THE RESULTS OF 5 NATIONAL STANDARDIZED PREVENTION OF DISABILITY IN HANSEN'S DISEASE COURSES FOR THE TRAINER SUPERVISOR WHICH COVERED ALL 27 BRAZILIAN STATES IN 1997 AND 1998

Linda F. Lehman, Hannelore Vieth, Maria Beatriz P. Orsini, Maria Leide W. Oliveira

National Coordination of Sanitary Dermatology (CNDS), National Health Foundation, Ministry of Health, Brasilia, D.F., Brazil
American Leprosy Missions (ALM), Greenville, S.C., USA

The coordinator of CNDS of the Ministry of Health in Brazil requested a collaborative National Prevention of Disability (POD) Project between the government and ALM in August of 1996. One of the primary goals was to integrate essential POD activities into all Hansen's disease control programs. For this to be accomplished, two standardized training courses were developed in 1997, one for the trainer/supervisor and the other for local health care workers. This presentation will focus on the results of 5 national train the trainer/supervisor courses.

The objective of this course was to prepare 2 persons in each state to provide technical and administrative support to the state by facilitating standardized courses and implementing systematic supervision of essential POD activities within the state's HD control programs in integrated public health facilities.

The results of pre and post course testing, the results of individual participant final course evaluations, the course facilitator's evaluations, and the up to date status of follow-up training and supervision activities at the state level will be presented.

The presentation will also look at needs identified during and after the courses, factors which facilitated and impeded course implementation, and recommendations for future courses of this kind.

TR04

THE DEVELOPMENT AND IMPLEMENTATION OF NATIONAL STANDARDIZED PREVENTION OF DISABILITY TRAINING COURSES FOR ALL 27 BRAZILIAN STATES

Linda F. Lehman, Hannelore Vieth, Maria Beatriz P. Orsini, Maria Leide W. Oliveira

National Coordination of Sanitary Dermatology (CNDS), National Health Foundation, Ministry of Health, Brasilia, D.F., Brazil
American Leprosy Missions (ALM), Greenville, S.C., USA

The coordinator of CNDS of the Ministry of Health in Brazil requested a collaborative National Prevention of Disability (POD) Project between the government and ALM in August of 1996, to start in 1997. This presentation will focus on the POD training courses currently being adopted in Brazil.

The essential components to be discussed are:

1. The recognition of the size of the HD problem in Brazil with 27 states and over 5,000 municipalities.
2. The recognition that POD is "an essential component of leprosy control programs"(WHO).
3. The identification and selection of a project coordinator.
4. The identification and selection of a national POD advisory committee.
5. The identification of POD needs in training and supervision.
6. The consensus of a working definition for POD and essential POD activities and tasks.
7. The elaboration of two types of courses, one for training trainers/supervisors and the other for training local health care workers.
8. The elaboration of educational material and training methods.
9. The establishment of a strategy which would enable each state to have its own capacity to train and supervise POD activities.
10. The development of evaluation criteria.
11. The identification of needed political and financial support required for a successful outcome.

TR05

DISTANCE EDUCATION IN LEPROSY

V. Uma, John Stephen, S. Arunthathi, P. Krishnamurthy, N.B.B. Reddy
Damien Foundation India Trust, 27, Venugopal Avenue, Spurtank Road, Chetpet, Chennai - 600 031, India.

In the context of the goal of elimination of leprosy as a public health problem by 2000 AD, and impending disbandment of vertical leprosy services in many areas, it becomes imperative to ensure that general health personnel are equipped with skills and knowledge to diagnose and manage leprosy. A distance learning programme has been developed by the DFIT in leprosy as an innovative educational strategy to cater to those health personnel who do not have the time and resources to undergo formal training in leprosy. The distance learning curriculum includes 10 modules of self directed, problem based learning materials. The requirements include participation in 2 contact sessions and the completion of 10 sets of assignments. Individualised feedback was given for the assignments. Contact sessions relied on task based, small group learning. Candidate performance was measured with objective structured clinical examinations. The distance education programme has been pilot tested on a total of 12 participants who were enrolled in 1997. Preliminary evaluation suggests that, with improvisations, distance education could become a highly effective and efficient educational intervention. The results of the final evaluation of one year experience with distance education will be presented at the conference.

TR06

TRAINING FOR LEPROSY: WHERE DO WE GO FROM HERE?

S.A.R. Krishnan, Guido Groenen, Tesfaye Bulto

ALERT, P.O.Box 165, Addis Ababa, Ethiopia

The number of leprosy patients is decreasing world-wide. Specialized leprosy control projects, and even special services specifically aimed at leprosy patients (rehabilitation, vocational training, etc.) will become less and less cost efficient. At the same time, the number of leprosy patients that a single health worker will see, be it in a specialized leprosy programme or in an integrated general health care setting, risks becoming too low to maintain the necessary skills for diagnosis, treatment and prevention of disabilities.

How can we ensure the sustainability of the essential leprosy control functions in a situation of low endemicity?

Training of the general health staff at all levels would seem to be one of the key areas. However, specialist training of long duration (the kind of training still being given at the various leprosy training institutions) will not be acceptable, nor would it be appropriate. We have to devise new approaches to training in order to reach our target group. Some of the possibilities that are being examined:

- ready-made training packages, tailor made for a specific programme by one of the specialized institutions, to be used peripherally by local facilitators, trained in the use of the package by the specialized institution.
- distance learning courses (could be a suitable strategy for supervisors at the district level and above).
- inclusion of the essentials of leprosy control in the curricula of the medical and paramedical training institutions: this would ensure that all future doctors, nurses, lab technicians, physiotherapists, etc. are aware of leprosy.

It is the task of institutions like ALERT to develop these new training strategies together with the National Leprosy Control Programmes and the ILEP members.

TR07

FIELD BASED TRAINING IN HEALTH EDUCATION IN LEPROSY - A NEW APPROACH

T.Ethiraj, V.Uma, P Krishnamurthy
Damien Foundation India Trust, 27 Venugopal Avenue,
Spurtank Road, Chetpet, Chennai : 600 031, India

On the eve of entering the phase of horizontalisation of leprosy eradication programme, active case detection methods will have to be replaced by passive ones, the prime among them being voluntary reporting of leprosy cases. Proportion of voluntary cases among the new reflects to a large extent on the level of awareness about leprosy among the people. In this context, DFIT has made an effort in this direction. A workshop for training of trainers was conducted in order to train the workers in health education at different projects.

The training methodology involved one day exposure to the participants to theoretical aspects through practical exercises, and two days of field based training which included, situation analysis, problem identification, setting objectives, selection of suitable methodology, implementation and evaluation.

A core team of trainers was selected to train the workers in each project. Each worker developed an action plan for his subcentre.

Details of methodology and post training experience will be discussed.

TR08

LCA/LCS Training, Present and future, in Bangladesh.

Dr. Md. Delwar Hossain, DBLM - Nilphamari

Abstract :

Wanting to change the poor quality services that have been prevailing in the field of leprosy all over the country, we have developed a system which has been implemented experimentally over 70 paramedical workers and 20 supervisors of our own organization in different relevant courses. We found our system has successfully been producing able, confident and committed best ever staff. Careful candidate selection, providing task-oriented training and smooth absorption of newly graduated staff under close supervision, at least for the first few months, are vital for ensuring the quality services in the field. We found 4 months and 2 months basic courses for the PMWs and Supervisor respectively are essential at present context.

TR09

FOLK-A POTENTIAL MEDIA IN HEALTH COMMUNICATION

Sudhakar Bandyopadhyay
Gandhi Memorial Leprosy Foundation.
Balarampur Control Unit: Purulia:723143 : INDIA:

Folk is an attractive entertaining and educative media for mass communication with special relevance to rural people. Folk media could effectively be explored to disseminate messages, to increase people's awareness and possibilities for action, to solve difficult social issues. Action on stage have led to real life actions in many instances.

In Balarampur Unit of Gandhi Memorial Leprosy Foundation Folk media mainly puppetry and street Play are being employed for Health communication. A well-equipped team with locally prepared puppets, dresses, folding dias and music system perform the programmes. Stories for both the puppetry and street play are related to local incidents and scripts are prepared by the Leprosy workers.

An analysis of data collected for last 5 year (1992-96) produces encouraging outcome. Total 196 (Puppet-161 and Street Play-350) programmes were conducted in 151 villages with an average audience of 400. The effects include onspot reporting of 94 persons with suspicious lesions. Total 207 patients were reported and registered including cases referred by teachers, community leaders and family members being influenced by the programmes. It also helped prepare grounds to solve unfavourable social issues. It has also helped regularizing treatment compliance of patients.

The above findings suggest that folk media has potential contribution to creat mass-awareness in Leprosy and to change behavioral pattern as well.

TR10

FUNCTIONAL MANAGEMENT TOOLS IN LEPROSY WORK

J. Ravichandran, T. Jayaraj Devadas
GLRAVALES-INDIA, #4, Gajapathy Street, Shenoy Nagar, Chennai 600030.

A Management Tools Workshop was designed by Ilep working committee for the project managers keeping the specific needs of Leprosy control programme. German Leprosy Relief Association and Swiss Emmaus Leprosy Relief Work India conducted a series of workshops during the two years 1996-97 covering about 40 NGOs in South India. A study was made to evaluate the effect of this training. Following are the findings:

- 86.4% reported that they are able to analyse the present situation of the project and accordingly they could prepare annual plan of action as well as a long term plan of action.
- 91.8% of the NGO's stated that now the vision about the mission is cleared. They could specify their priorities more precisely.
- 81.3% of the NGO's are now in a position to forecast a financial budget in a scientific manner different from the traditional manner.
- More than 73.9% of the NGO's could identify the areas where cost control is possible. Their annual financial outlay for 1998 is about 22 to 34 % less than that of 1995 budget.
- 64.2% of the NGO's acknowledge that they have improved inter personal relationship with staff and between staff.
- 39.6 % of the NGO's were in a position to identify excess staff who could be reduced without affecting the delivery of prevailing quality services.
- More than 74.1% of the NGO's informed that they are able to appreciate the significance of data available from their own ILEP 'B' forms (annual report)

The study revealed that Functional Management Tools will bring cost effectiveness and efficient management of Leprosy programmes.

TR11

WORKING WITH NON-BIOMEDICAL HEALTH CARE PROVIDERS FOR LEPROSY ELIMINATION

Nimal Kasturiyarachi[1], Penny Grewal[2], Mitchell Weiss[3], Padmini Gunawardene[4], Dayamal Dewapura[2], Sunil Settinayake[4], Lakshmi Somatunga[4], Vinya Ariyaratne[1]

[1]University of Peredeniya, Sri Lanka, [2]Novartis Foundation for Sustainable Development, Switzerland, [3]Swiss Tropical Institute, Switzerland, [4]Anti-Leprosy Campaign, Sri Lanka, [5]University Sri Jaywardenepura, Sri Lanka

Misdiagnosis of leprosy among general health care providers, particularly ayurvedic practitioners, is common and has serious implications for the elimination of leprosy and the deformity load in the community.

A study was carried out in Sri Lanka among different types of health care providers, using photographs of representative signs of leprosy and a vignette describing the disease symptoms, in order to assess their diagnostic knowledge, treatment and referral patterns and sources of information.

The findings reveal that ayurvedic practitioners, particularly the non-graduates, tend to misdiagnosis leprosy. There are primarily two reasons for this: First, a lack of training in leprosy and/or inadequate clinical exposure for the few who were trained. Second, the existence of ayurvedic illness categories which resemble the symptomatology of early manifestations of leprosy which lead them to misdiagnose leprosy.

As health care providers with non-biomedical backgrounds outnumber those with a biomedical background in many Asian countries, it is important to include them in leprosy control activities. They are also easily accessible and charge relatively low consultation fees. Moreover, with the low incidence of leprosy, affected persons may not suspect are suffering from leprosy and would consult ayurvedic practitioners.

However, developing training programmes for such practitioners poses special challenges. One key issue is to incorporate biomedical knowledge into the ayurvedic ideological framework so that they entertain a differential diagnosis of leprosy. Another is to motivate them to refer persons suspected with leprosy for treatment as they lack a tradition of referrals. It is also crucial to develop innovative and cost effective methods of training to reach a significant number of ayurvedic practitioners.

TR12

IMPACT OF LEPROSY TRAINING TO GENERAL HEALTH WORKERS IN BANGLADESH

Ahsan Ali, Jalal Uddin Ahmed, Derek Lobo, Nepisha Begum

National Leprosy Control Programme, Dhaka, Bangladesh

Leprosy services were integrated into the general health services of Bangladesh in phases as of November 1993.

Prior to the establishment of MDT services at Government Health Centres, a 6-day training for doctors and a 1-day training for all the general health staff was given. The objectives of general health staff training were simple :

* to recognise early signs, suspect leprosy and refer the suspect case to the nearest health centre.
* to follow-up on treatment defaulters and motivate them.
* tp provide basic information on leprosy to the public.
* to support the leprosy services in the health centre.

Over 31,000 general health workers and 1,100 doctors from health centres and medical colleges were provided the training over a 5-year period from mid-1993 to date.

The details, outcome and impact of this massive training programme and its contribution to achieving the leprosy elimination goal in Bangladesh will be presented and discussed.

TR13

TRAINING NEED ASSESSSMENT IN THE SUPERVISION SKILL OF THE DISTRICT LEPROSY SUPERVISORS IN INDONESIA

Djohan Kurnia
National Leprosy Training Centre, Ujung Pandang, Indonesia

The training need in supervision skill of the district leprosy supervisors (wasors) in Indonesia who supervise the health centre leprosy workers were assessed to ensure the achievement of the national (and global) goal of elimination of leprosy / 2000. Thirty three among approximately 300 district wasors (11%) from 8 province representing arbitarary the eastern, central and western part of the country, were assessed by the provincial leprosy doctors or the leprosy supervisors. Data was obtained by interview and observation method using a check-list. The assessment study revealed that no special training course in supervision is needed provided constant guidance is given to the district supervisors. The guidance should include the importance of using a check-list during supervision (preferably providing a model check-list) , improving ST and VMT techniques, the knowledge about the signs of severe reactions, identifying inadequacy in the performance of the health centre workers, improving it on the spot and recording the supervision which will serve as a report, feed back and material for the next visit.

TR14

THE PATIENT AS A COMMUNITY EDUCATOR IN THE CITY OF SÃO BERNARDO DO CAMPO,BRAZIL

Costa,Maria de Fátima da

SORRI-Sorocaba,Brazil

Education is a fundamental component in the efforts towards Leprosy elimination. The distance between the health workers language and the patient~s is often an obstacle to communication.

The paper presents a report of 10 years of health education performed by patients in Brazil. The impact of the efforts are discussed and suggestion for Leprosy education are proposed.

TR15

INCOME GENERATION PROJECT FOR PERSONS AFFECTED BY LEPROSY AND DISABILITIES IN THE AREA OF SOROCABA, BRAZIL

Bakirtzief, Zoica

Sorri-Sorocaba, Brazil

The income generation project for persons affected by Leprosy and disabilities is being implemented in the area of Sorocaba, Brazil. The objectives are to equip persons affected by Leprosy and disabilities to develop economically viable businesses so that they can contribute to the socioeconomic development of their families and communities restoring their dignity.

There are 791 persons affected by Leprosy in their economically active years (15-60 years of age) in the region, and 12,500 persons with disabilities. There are good public services in health and education. But there are no socioeconomic rehabilitation programs available.

The training methodology was developed at the University of Georgia (USA) where the whole business administration curriculum is taught to low income students by using role play activities that simulate a business experience and procedures. The curriculum was translated to the local language and the games were adapted to the situation and a pilot training was conducted.

The results of the pilot training are discussed and suggestions are made as to the use of hands-on approach to teach business administration to persons affected by leprosy and disabilities with little formal education. The project was developed with the partnership of the patients their participation is discussed.

TR16

HEALTH MANPOWER FORMATION IN POST-ELIMINATION ERA IN LEPROSY.

D. S. Chaudhury, Kunal Saha and M. Chaudhury

Leprosy Training Centre, German Leprosy Relief Association - Calcutta, India.

Training of Health Workers in Post-elimination era need conceptual reassessment. The curricula contents need be revised.

With the expected decline of prevalence in countries the needs of disabled persons have to be attended to. A part of this work would be within the ambit of the social welfare services. However the major responsibility will be with the health services to ensure care after cure as well as to interact with the Social Service Institutions for promotion of physical,economic and social well-being of the persons.

All Health Workers, would be required for early case detection, identification of persons at risk and for surveillance to detect relapses.

All these require purposeful training and orientation of the Staff as has been discussed in the paper.

TR17

A QESTIONNAIRE-BASED SURVEY IN ASSESSMENT OF KNOWLEDGE AND SKILLS IN EARLY DIAGNOSIS OF LEPROSY AMONG MEDICAL STAFF AT DIFFERENT LEVELS

Shu-min Chen, * Rong-tao Zheng , * Bing Li , * Lin Zhang * Cun-lian Han, ** and Xun-dong Wang **

* Shandong Provincial Institute of Dermatology.

** Ji Ning Leprosy Hospital,China

In order to assess the knowledge and skills regarding early diagnosis of leprosy, 33 village doctors, 34 township doctors, 27 doctors in county hospitals from 3 counties, 22 physicians and surgeons as well as 13 dermatologists in two provincial hospitals were selected to complete self-administered questionnaires. Following were the results: correct answers of pathogen of leprosy were 82%, 94%, 81%, 86% and 100% respectively; of life-long medications were 91%, 88%, 89%, 72% and 85%, respectively; of MDT were 0%, 0%, 19%, 0% and 62% respectively; of infectivity of sole ulcers were 30%, 38%, 15%, 18% and 62% respectively; of early symptoms of leprosy (defined as numbness of extremities) were 52%, 26%, 30%, 5% and 77% respectively: of early signs of leprosy (defined as anesthetic skin lesion with or without peripheral never enlargement) were 0%, 3%, 33%,5% and 100% respectively; of how to do physical examination when a person was suspected of leprosy were 36%, 6%, 18%, 0% and 100% respectively; of having the knowledge in skin smear and biopsy when a person was suspected of leprosy, were 30%, 29%, 41%, 23% and 100% respectively. Many of the investigated subjects did not know where or whom to refer a suspect or a diagnosed leprosy patient for confirmation of diagnosis and treatment.

The authors recognized that majority of the medical staff at different levels in this group, except dermatologists, were lack of knowledge and skills in early diagnosis of leprosy, so that a relevant training programme in early diagnosis of leprosy should be conducted in a planned manner.

TR18

IN SERVICE TRAINING MODULE FOR SOCIAL ASSISTANTS AND THEORETICAL METHODS OF ASSESSMENT OF SUCH PRACTICES IN THE ATTENTION FOR HANSEN'S DISEASE PATIENTS

Otilia Simões J. Gonçalves, Heleida N. Metello, Wagner Nogueira, Angelina Lopes, Carmem Luisa M.P. Guisard, Ana Angela Alcantara C. Cardoso, Maria Sebastiana F. Bizetto, Raquel C. Jesus, Marcia H. Verri, Rute Pereira M. Coutinho

This paper relates the experience of the construtions of the theoretical and pratical module of in-service training for Social Assistants in the actions for social attention of Hansen's disease patients.
The authors present the phases and strategies for the development of this process at central level and the necessary interfaces with the regional realities that insue the theoretical identification and the operation of specific actions of the Social Assistants with the patients and the work of these professionals integrated with the other professionals of the team in health services.
In concludes with the presentation of the lines that design the practice of these professionals in the services offered to our clients, especially regarding Hansen's disease patients, through the definition of the atribuitions and actions left to them and therefore, the profile of the theoretical insertion of their routine practices.

TR19

INFORMATION ABOUT LEPROSY

Joke Moet, Hans Reesinck,Ati Kisyanto, Shafiq, Tanny Hagens
Health Department Republic Indonesia, The Leprosy Mission International

'Info Kusta' is Indonesian for Information about Leprosy. The poster is in the form of a cartoon story. The pictures are clear, showing the early signs of leprosy.

One person is pointing at the patches on the back of his friend. The person with the patches is advised to go to the health centre for examination. At the time of examination, the patient mentions that the patches are not itchy and have no feeling. Leprosy is confirmed by the docter.

He expresses fear but health education is given and he is reassured.

In the summary, the early signs are mentioned, and the necessity of going quickly to a health centre for examination, because if it is leprosy, it can be cured if treated while still in the early stage.

TR20

HELPING HEALTH WORKERS LEARN TO DIAGNOSE TUBERCULOSIS AND LEPROSY:

S.A.R. Krishnan

ALERT, P.O.Box 165, Addis Ababa, Ethiopia.

The aim of this presentation is to explain the clinical teaching approach as an effective method of training rural health workers to diagnose early tuberculosis and leprosy. It deals with what to teach and how to teach it, in a realistic clinical situation. Trainees should be able to detect any patient with early signs of leprosy or tuberculosis.

The following important points are covered in detail in the poster:

- Matching aims and methods
- Mapping out the concept for a deeper understanding
- Planning clinical teaching with defined clinical tasks
- Clinical teaching with clinical practice
- Mastering clinical skills in the clinical situation

TR21

LEPROSY AND TROPICAL SKIN DISEASES: DEVELOPMENT OF THE CURRICULUM FOR FINAL YEAR MEDICAL STUDENTS IN ETHIOPIA

S.A.R. Krishnan, Guido Groenen

ALERT, P.O.Box 165, Addis Ababa, Ethiopia

ALERT, the All Africa Leprosy Tuberculosis and Rehabilitation Training Centre, has been providing a 3-week course in leprosy and dermatology for final year Medical Students in Ethiopia for many years.

Objective: To identify students needs, and to find out how far the courses at ALERT meet those needs.

Subject: 459 final year Medical Students participated in the training program between 1993 and 1997. They were asked to fill in a questionnaire about the course objectives, its contents, teaching methods and duration. They were interviewed in groups.

Results: Students expressed a clear desire for less leprosy and more tropical dermatology in the course. They also requested more task-based learning than classroom learning.

Conclusion: While the need for continuing training of all health workers in leprosy is recognised, this study shows a worrying decline of interest in leprosy on the part of this group of future doctors.

TR22

TRAINING AT ALERT IN 1999

Guido Groenen, S.A.R. Krishnan, Tesfaye Bulto

ALERT, P.O.Box 165, Addis Ababa, Ethiopia

The All-Africa Leprosy, Tuberculosis and Rehabilitation Training Centre will offer the following courses in 1999.

- Prevention and Management of Disabilities (6 weeks)
- Introduction to leprosy (2 weeks)
  - ⇒ for physicians
  - ⇒ for senior field staff
- Management of combined Leprosy and Tuberculosis Control Programmes (4 weeks)
  - ⇒ for physicians
  - ⇒ for senior field staff
- Essentials of Leprosy and Tuberculosis
  - ⇒ for physicians (6 weeks)
  - ⇒ for administrative and programme support staff (2½ weeks)
- In-service training in
  - tropical dermatology (2 to 4 weeks)
  - leprosy surgery (2 to 6 months)
  - tropical eye care (2 to 12 weeks)
  - physiotherapy for leprosy patients (1 to 3 months)

For the exact dates, please consult the 1999 Training Calendar, available from the ALERT delegates, or contact:

ALERT Training Division
P.O.Box 165
Addis Ababa, Ethiopia
Tel.: + (251) 1 711524 or + (251) 1 712792
Fax: + (251) 1 711199 or + (251) 1 711390
E-mail: AHRI@TELECOM.NET.ET

TR23

OCKIE KRUGER,FRIKKIE NAUDE, ERNEST RAMABOKELA

THE LEPROSY MISSION SOUTHERN AFRICA

In countries with a low prevalence of Leprosy, you need to keep your awareness programmes on a high standard In South Africa we experimented on several ideas and found that one of the most effective ways of doing it is to produce a poster which can be used for Awareness,diagnosis,Health Education and at the same time provide essential information about Leprosy and where people can get help from

The different classification of the poster consists of Photos, a slogan and written information

It is already tested in South Africa and even led to self-diagnoses by patients It proves to be very effective in clinics,hospitals and other public places, like health centres, schools and shopping centres

Medical staff find it very usefull in keeping them aware of the disease but also for providing the necessary information for treatment

TR24

FIELD TEST OF THE CLARITY OF THE SELF-CARE BOOKLET FOR LEPROSRY PATIENTS PRODUCED AT NLTC, INDONESIA

Djohan Kurnia
National Leprosy Training Centre, Ujung Pandang, Indonesia

The " Self-Care Booklet for Leprosy Patients " produced at the National Leprosy Training Centre, Indonesia, was field tested for its clarity to the patients. Five areas of leprosy control programme prominant in the prevention of disability activities were selected for the study. The test was conducted by the leprosy doctors using a questionnaire accompanied by an instruction of how to fill it out. The questionnaire contains questions and instructions derived from the Booklet. The patients were asked to answer the questions and instructions before and after reading the Booklet in the sections compatible to the disability (ies) they are suffering from. The differences between the mean correct answers before and after reading the Booklet was compared. The result showed that for the messages on insentive hand, foot, with or without ulcer and on lagophthalmus, the differences were significant ($p < 0,05$ to 0,01) For the messages on claw hands,claw toes and drop foot, the differences were insignificant ($p > 0.05$) and these parts of the Booklet need improvement.

TR25

DEVELOPMENT OF A CHECK-LIST BY TASK ANALYSIS TO ASSESS THE COMPETENCE OF THE DISTRICT LEPROSY WORKERS IN SUPERVISING THE HEALTH CNETRE JUNIOR LEPROSY WORKERS

Djohan Kurnia
National Leprosy Training Centre, Ujung Pandang, Indonesia

A check list for assessing the competence of the district leprosy workers in supervision skill,who will supervise the heath centre leprosy workers, the spearheads of the elimination programme, has been developed by Task Analysis technique. The Check List can be very useful for the programme managers, particularly those at the provincial level to identify the need for improving the district leprosy workers

TR26

HAND AND FOOT SENSORY STATUS OF OVER 250 HEALTH CARE WORKERS PARTICIPATING IN PREVENTION OF DISABILITY TRAINING COURSES IN BRAZIL FROM 1993 TO 1998

Linda Faye Lehman

National and state POD training courses, Brazil
American Leprosy Missions, Greenville, S.C., USA

The practice of sensory testing during training courses is important to enable participants to develop both manual and interpretive skills. Participants have hands on experience testing each other as well as seeing what it is like to have their own hands and feet tested. Participants learn to understand what hands and feet of persons without pathology can feel. This enables them to suspect and/or identify mild sensory changes in early nerve impairment and identify severe sensory loss which would put a person at risk of injury during clinical practices with patients.

This poster demonstrates the response of over 250 health care workers hand and foot sensory status using the Semmes-Weinstein monofilaments. The monofilaments used were 0.05g, 0.2g, 2g, 4g, 10g, and 300g. All participants without pathology could feel the light touch of a pencil. Participants practiced imitating the pressure felt with the 2g monofilament with the pencil. All health care workers with known pathology were excluded from the analysis.

The importance of this poster is to demonstrate health care workers without known pathology were able to feel with their hands and feet. It raises the question if there are regional differences accounting for differences noted in sensation world wide.

TR27

IS THERE STILL A NEED FOR TRAINING IN LEPROSY SURGERY?

S.A.R. Krishnan, Guido Groenen, Roland Kazen, P E Gravem

ALERT, P.O.Box 165, Addis Ababa, Ethiopia

As the number of leprosy patients decrease due to successful leprosy control, the need for specialised surgeons working full time on leprosy patients will also decrease. The motivation for financing and recruiting leprosy surgeons will diminish. Patients at risk of acquiring disabilities will still remain for some considerable time, and it would be unfair to withhold the potential benefits of surgery from those who could be helped by it. Preventative and Rehabilitative Surgery (PRS) is an essential part of any Prevention and Management of Disability programme. Even in an integrated setting, where leprosy control is part of the general public health activities, PRS should be available at the district or sub-regional level.

Leprosy surgery uses techniques from many specialities, especially from hand-, plastic-, and orthopaedic surgery. Any general surgeon with access to a standard operating theatre could perform basic PRS after a reasonable time of training in the principles of PRS.

The most efficient way to preserve the necessary skills and expertise seems to be to make sure that the representatives of the relevant surgical subspecialties are able to take care of specialised surgery on leprosy patients as part of their work. It is thus up to the specialised leprosy institutions that still have expert leprosy surgeons to start training those specialists. Once trained, they will be the resource people who will train the peripheral general surgeons in PRS in an integrated setting.

TR28

INVOLVEMENT OF NONALLOPATHY MEDICAL COLLEGES IN CASE DETECTION

S.S. Naik and R. Ganapati
Hind Kusht Nivaran Sangh-Maharashtra Branch, ALHR, Wadala, Mumbai-400 031, India.

Leprosy teaching in non-allopathy medical colleges is practically negligible or not up to the mark in India. Medical graduates passing out from these medical colleges generally set up their private medical practice at the grass root level catering to the low socio economic group among which the possibility of detection of leprosy cases is comparatively more.

In Maharashtra State of India there are 37 Ayurvedic, 37 Homeopathic and 5 Unani Medical Colleges where approximately 4000 new admissions are taken every year. In 1992 an inter-

action with these medical colleges by organising teaching sessions on leprosy to medical students was initiated. In order to ensure continuity in leprosy teaching, training of leprosy to teachers of the medical colleges was also undertaken. As such 39 medical colleges have been covered during the last 5 years and practically 1200 students received the benefit of leprosy teaching every year.

The follow up was maintained with these students by correspondence. It was found that graduated students who succeeded to obtain job as well as those who started their private practice detected 351 new leprosy cases during the last five years. This experiment indicates that involvement of non-allopathy medical colleges is fruitful method for case detection in leprosy.

TR29

SPECIAL ACTION PROGRAM TO INVOLVE DERMATOLOGISTS IN URBAN LEPROSY PROGRAMME

VV Pai, CR Revankar, RG Chavan and R Ganapati

Bombay Leprosy Project, Sion-Chunabhatti, Bombay-400 022, India

It is estimated that 15-20% of leprosy patients prefer to take chemotherapy from practising dermatologists in Greater Bombay. Approximately 200 dermatologists are playing a significant role in the form of private health sector. It is observed that the criteria for identification, diagnosis, classification and treatment are arbitrary and deviant from WHO/NLEP strategies. Hence a project under SAPEL was undertaken with an objective to involve and orient dermatologists to improve the quality of the above aspects relating to leprosy elimination.

Workshops were held for 31 dermatologists in six batches on subjects such as current concepts in chemotherapy, skin smear taking, staining and laboratory aspects of leprosy. Simple reporting format was designed to collect information on the number of patients treated. Field workers visited the identified dermatologists to provide smear facilities, collect slides and provide reports. A questionnaire feedback after this effort showed the following impact.

1	No. of dermatologists participating	31
2	No. of dermatologists trained in skin smear examination	8
3	No. of patients registered for MDT	463
4	No. of patients completed treatment *	
	• PB-MDT - 6 doses	55
	• PB-MDT - > 6 doses	27
	• MB-MDT - 24 doses	52
	• MB-MDT - > 24 doses	50
5	Patients with reaction managed scientifically	597

*It is felt that many more sessions will be needed to orient them on the principles of fixed duration treatment.

The success of this Bombay experiment calls for coverage of several groups of dermatologists on the SAPEL model all over the country.

TR30

THE INTERNATIONAL FOUNDATION FOR DERMATOLOGY

Terence J Ryan, Department of Dermatology, Churchill Hospital, Oxford, UK

Conceived in 1987, this Foundation seeks solutions to care of the skin in the developing world..

Its principle mission is 'training' and for this purpose a Regional Dermatology Training Center was built in Tanzania for the countries of the Commonwealth Regional Health Secretariat of Central Eastern and Southern Africa. This center provides an integrated training programme over a period of two years ending in a University Diploma. It has been designated to become a Collaborating Center for dermatology, sexually transmitted diseases and leprosy. A second Center trained 250 nurses from Health Centers in Guatemala and there are new plans for the eight countries of Francophone West Africa.

Management of leprosy and its consequences has always been a significant part of the programmes of the IFD.

This poster illustrates the buildings, the graduates, the subject matter of their dissertations and their influence on the health provision of rural communities, especially in Africa.

TR31

EDUCATION IN HEALTH - MAKING THEORY OUT OF PRACTICE

Maria Aparecida Pinheiro Sanches, Otilia Simões J. Gonçalves, Zenaide L. Lessa, Elza Berro, Maria de Lourdes B. Diniz

The project of creating a didatic instrument with the theme "Education in Health, Diagnosis and Educational Planning" derived from the experience in forming human resources for the Hanse's Disease control program. This elaboration was subsided by the practice offered to professionals in developing educating actions in the "Health Education Courses and Hansen's Disease Program", since 1991. The creation of such na instrument resulted from a process of collective construction and reconstruction derived from the practices developed in the Pedagogical Workshops of Health Education and Local Planning. Participants have assessed, in step-by-step practice, its practical use, with a 95% approbation. The final product "Education in Health a Guide for Planing Educative Actions: Practice and Theory" reasulted in a theoretical, methodological and practical reference for Education in Health, with focus on the concepts of Education, Communication, Participation, Diagnosis and Participative Planning of actions and has been offered to the regional and local branches for the planning of educative actions.

TR32

HEALTH EDUCATION AND COUNSELLING: A KEY TO MULTIDRUG THERAPY COMPLIANCE IN LEPROSY.

M.M. SIDDIQUI

Urban Leprosy Centre, Lok Nayak Hospital, New Delhi (India).

The Urban Leprosy Centre of Lok Nayak Hospital, New Delhi was established in 1981 and every year about 350 to 400 new Leprosy cases are registered in the centre. 70% of the patients attending leprosy clinic are illitrate.

Counselling on 1500 Leprosy patient of both sexes attending the Urban Leprosy Centre of Lok Nayak Hospital and associated Maulana Azad Medical College New Delhi were inducted for counselling as per stipulated proforma each patient was administrated 600 mg of Rifampicin once a month supervised, Dapsone 100 mg daily Clofazimine 50 mg daily along with Clofazimine in the doses of 300 mg once monthly in multibacillary (MB) Leprosy and Rifampicin 600 mg once a month and 100 mg of Dapsone in Paucibacillary (PB) Lprosy (W.H.O.).

Health education material used for educating and counselling were flash card, and posters on Leprosy.

These patients were advised to report for follow-up every month accordingly details of counselling and Health Education were formed in each patient, and were recorded on a proforma devised for the purpose.

The data was ultimately analysed and it was found M.D.T. Counselling forms the important prerequisite for good compliance. This procedure should, therefore form a part component of Multidrug therapy at all Leprosy Centres.

TR33

AN ANALYSIS OF 291 NEWLY DIAGNOSED PATIENTS WITH LEPROSY

Fu-yuan Song, An-fen Qu and Gang Zhang

Shanglin Sanatorium, Shanglin County, Shanxi Province, China

Based on an analysis of 219 newly detected leprosy patients, the authors found that due to many very well-known reasons these cases have been diagnosed on an average of 4 years after the onset of

the clinical signs. During their first visit to the clinic, only 116 (39.87%) of them were timely diagnosed as leprosy, 64(21.99%) as suspects and 111 (38.14%) missed to be made a correct diagnosis. Amongst the latter 111 cases, 73 were misdiagnosed as other diseases, such as allergic dermatitis, neurofibromatosis, acne, pityriasis vesicolor, pityriasis rosea, polyneuritis, rheumatism, nephritis etc. Skin diseases and nervous diseases were common conditions mimicking early leprosy. The correct diagnosis rate during first visit to general hospital was 22.22% and that to leprosy professional clinic was 59.42%. The above mentioned data clearly indicated that health education about leprosy should be intensified for the community, medical students should be given more lessions in leprosy and practice teaching in leprosy clinic, and leprosy professionals working in county stations for skin diseases control should be given intensive/refreshed training because they frequently to have confirm diagnosis themselves for suspected cases.

TR34

"LUIZ MARINO BECHELLI" LEAGUE FOR THE COMBAT OF LEPROSY: AN EDUCATIONAL PROJECT

Cacilda S. Souza, Aldaisa C. Foster*, Norma T. Foss

Departments of Internal Medicine and *Social Medicine, Faculty of Medicine of Ribeirão Preto, University of São Paulo, Brazil

The objective of this presentation is to describe the creation, structuration and execution of an educational project directed at medical students for the teaching of leprosy through extracurricular activities.
The League for the Combat of Leprosy has been active for 6 years at the Faculty of Medicine of Ribeirão Preto, USP. Supervised volunteer work is carried out in order to provide the students with a general overview, with activities in the Program of Leprosy Control in the municipality of Ribeirão Preto, São Paulo, Brazil.
The activities involve care for leprosy patients and their relatives as well as educational actions directed at the students, health professionals and the population in general. As an educational project linked to the University structure, the League has three basic objectives: patient care, teaching, and promotion of research, thus integrating the University with the other levels of health and community services. The members of the League are stimulated to learn about leprosy both as a biological disease and as a social disease and public health problem within the community context at the socioeconomic level. Learning involves practical work such as supervised assistance, activities aiming at the prevention of morbidity and disability, and educational and health-promoting actions executed at a District Unit for primary health care. This type of work may contribute to medical training, helping the dissemination of knowledge, and expanding the services provided by the University to the academic-scientific medium and to the community. A first evaluation indicates that this project is feasible and stimulates education in the area of leprosy, having become a reference model for the execution of the Program of Leprosy Control in the Ribeirão Preto region.

TR35

FONTILLES CENTRO DE FORMACIÓN

José Terencio, Vicente Gimeno, José R. Gómez, María Quintana y Pedro Torres.
Sanatorio de Fontilles. Alicante. España.

Fundado en 1907 por el jesuita P. Ferris en Alicante una de las zonas más endémicas de España ha desarrollado en sus 85 años una triple labor Asistencial (tratando más de 3.000 enfermos) de Investigación y Formación.

En este aspecto ha realizado 74 Cursos de Leprología, 34 para Médicos y 40 para Auxiliares Sanitarios, Misioneros y Trabajadores Sociales, habiendo formado 2.800 personas.

Los Cursos son anuales teóricos y prácticas de Bacteriología y Anatomía Patológica, Fisioterapia y Cirugía.

El Profesorado,a parte del personal del Hospital colaboran Profesores de Dermatología de España y prestigiosos Leprólogos mundiales.

Entre los asistentes hay una importante participación internacional de países Latinoamericanos.

En los últimos años también se han impartido Cursos en Costa Rica, Nicaragua y Argentina.

TR36

THE DIFFERENCES BETWEEN HEALTH WORKERS' AND PATIENTS' INTERPRETATIONS OF SOME TERMS USED IN LEPROSY CONTROL: IMPLICATIONS FOR HEALTH EDUCATION

The purpose of this study was to determine the differences between health workers' and Leprosy patients' interpretations of some terms frequently used in patients' education. Forty one health workers and Eighty six leprosy patients selected from two leprosy referral hospitals were interviewed. Majority of the health workers were unanimous in their interpretations of the terms. Chi - square tests revealed significant differences between the health workers' and patients' interpretations of all terms, except one (P 0.05). As a result health workers need to take into consideration patients' own interpretations of terms used during health education.

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