



ICMR BULLETIN

COMMUNITY HEALTH CELL
325, V. Main, 1 Block
Koramangla
Bangalore-560084
India

Vol.19 No.12

December, 1989

SPEECH REHABILITATION BY LATE SURGICAL REPAIR IN CHILDREN WITH CLEFT LIP AND PALATE ANOMALY

Although communicable diseases still constitute the major cause of ill health, in developing countries noncommunicable diseases are also posing important public health problems in these countries due to various reasons. The noncommunicable diseases constitute a group of heterogenous disorders, many of which are associated with variations in life style, behaviour, socio-economic, environmental, population and genetic factors. Congenital abnormalities also form an important group of noncommunicable diseases. Various dental/oral disorders are being recognised, and treated and attempts are also being made to rehabilitate those afflicted with varying degrees of disability.

Congenital cleft lip and or cleft palate anomaly is an important condition in terms of the epidemiological factors, racial and ethnic group variations, etiology, surgery, orthodontics, speech pathology and prosthetic rehabilitation. Children afflicted with this anomaly are handicapped right from birth with respect to breast feeding, deglutition, recurrent nasobronchial infection, defective speech, improper growth and development of the maxillary arch and overall face development affecting the total personality of the individual. Most of the Indian population (about 76%) live in the villages, some of which are located in the interior and not easily approachable by any mode of transport. The low level of literacy, lack of proper health education and in many the low socio-economic status are some of the factors which contribute towards improper or inadequate rehabilitation of these children. The advanced medical centres/institutions/

hospitals catering to such children and providing physical, functional and psychological rehabilitation, are still not adequate in terms of qualified personnel, investigative and management facilities. Keeping the above factors in view and the quantum of the problems faced in our country, multidisciplinary Cleft Palate Clinics should be planned and organised at many centres in the country where collaborative and concerted efforts should be put in by the Cleft Palate Team to go into all aspects of this anomaly viz diagnosis, treatment and rehabilitation of these handicapped children.

Types of Cleft Anomaly

The anomaly can present in a number of ways and in different combinations of varying severity. The cleft can be of the primary and/or of the secondary palate. Clinically, there is great variability in the degree of cleft formation. There could be a minimal degree of involvement such as linear lip indentations, bifid uvula and submucous cleft of the palate. The cleft palate may be limited to the uvula or it may be more extensive involving the soft palate or both soft and the hard palate as well as alveolar ridge and the lip. Although the clefts have been classified in various ways, only two or three classifications¹ are well accepted all over the world and these are based upon the embryology or the nomenclature.

Incidence

In a country like India with a population over 800 million, it is pertinent to know the quantum of the

problem of this anomaly for purposes of planning the manpower required and development of centres for investigations and rehabilitation as well as community health education. In India, though no regular epidemiological surveys have been conducted, a large number of studies²⁻¹⁷ on newborns for congenital malformations including this anomaly, have been reported during the past two or three decades. From these reports, the pooled incidence of major malformations in total births at 26 large hospitals from big cities and towns from different parts of the country is estimated to be 14.82 per 1000 births (2695 total malformations from amongst 1,81,798 births). Of these malformations, the incidence of cleft lip and palate is 1.25 and that of cleft palate alone is 0.46 per 1000 births. In other parts of the world, the incidence of this anomaly is reported to be the highest in Afghans (4.9)¹⁸ and American Indians (3.6)¹⁹ and lowest in the Negroid population (0.4 per 1000 live births)²⁰.

Cleft lip and or cleft palate anomaly constitutes nearly one-thirteenth of all congenital malformations, thus making the most conservative incidence of this anomaly as 1.7 per 1000 live births excluding the associated syndromes.^{17,21,22} These figures indicate that the problem is rather large for a population of over 800 million people and its management becomes much more complex because of the involvement of so many factors. The population growth rate is very high *ie* over 22 million children are born each year. Thus the magnitude of rehabilitation of the affected children poses a great problem in terms of manpower and budgetary inputs.

Community Distribution

Patients attending the All India Institute of Medical Sciences (AIIMS), New Delhi, are mainly from north India *ie* from Delhi and the adjoining states. India is a country which has all the major religions of the world, hence it offers a unique population for a genetic study. The marriages in this country as a rule take place within the same religion, caste and sub caste but amongst different *gotras* (among Hindus). It will be seen that the prevalence of the anomaly is more or less on the pattern of the population ratio in the country, except among Muslims and Sikhs. Amongst the Hindus which is the largest population group (around 82%), the *Agarwals* and *Brahmins* have the highest incidence (Table I).

Sex Distribution

It has been reported that males are affected more than females. Among the 650 patients with this anomaly analysed at the AIIMS, males (383; 58.92%) were affected

one and a half times more than females (267; 41.08%); giving a M:F ratio of 1.4:1.

Table I. Distribution of propositi according to caste amongst Hindus (N-490)

Caste/sub caste	No.	%
Agarwal	89	25.36
Brahmin	88	25.07
Khatri	40	11.39
Rajput	38	10.82
Kayasth	29	8.26
Arora	27	7.70
SC/ST	22	6.27
Jat	18	5.13
Total	351	100.00

SC/ST—Schedule caste/ Schedule tribe.
139 subjects could not be classified.

Side Distribution

In the unilateral clefts of the lip with or without cleft of the palate the left side was found to be affected more than twice that of the right side (2.3:1; Table II).

Table II. Side involvement in unilateral clefts out of 650 patients

Cleft Type	Side		Total
	Right	Left	
CL only	12	12	24
CL+AL	15	38	53
CL+PP	2	1	3
CL+PP+SP	79	195	274
Total	108	246	354

AL—alveolus; PP—primary palate; SP—secondary palate

It was observed that around 14 per cent of the children had cleft lip with or without alveolus, 68 per cent had cleft lip with cleft palate (either unilateral or bilateral) and about 18 per cent had isolated cleft palate. This indicates that about two thirds²³ of the children had a

severe type of cleft which created real problems in the management.

Etiology

In spite of available literature on the etiology of cleft lip and or cleft palate anomaly, confusion still exists on account of the failure to distinguish between cleft of the lip and other parts of the primary palate (with or without a cleft of the secondary palate) and cleft of the secondary palate without cleft of the primary palate. The developmental basis for clefts of the lip is still poorly understood and is controversial.

The anomaly is said to be of multifactorial inheritance and mostly occurs due to an interaction of both genetic and environmental factors. A number of etiological factors have been put forth such as the seasonal effect, social status, malnutrition, infectious diseases during pregnancy, parental age and effects of eclipse *etc.* Some workers have assumed that the patients with a positive family history have a genetic etiology and those with a negative history do not. This assumption is unjustified, as even when an autosomal recessive gene is known to be the cause many patients will have a negative history. Hence these genetic factors could be considered as single mutant genes, chromosomal aberrations, environmental teratogens and multifactorial inheritance.

On the basis of etiology, the clefts as seen at the AIIMS were classified as follows:

- (i) Familial: When this anomaly also had occurred in a close relative (second cousin only).
- (ii) Teratogenic: When there was a definite history of exposure to teratogenic drugs during the first trimester of pregnancy.
- (iii) Sporadic: Those which did not fall into the other two groups.

The distribution of clefts on the basis of this classification is shown in Table III.

The teratogenic group was further analysed on the basis of steroidal and non-steroidal drug therapy administered to the mothers during the first trimester of pregnancy. The steroidal drugs²⁴ were used to control threatened abortion or for confirmation of pregnancy or for treatment of irregularity of menstruation and sterility, and also for oral contraception. These constituted a major group of steroidal drug therapy. In the non-steroidal group the drugs used were abortifacients, antinauseants, tranquillizers, anticonvulsants *etc.*

Table III. Distribution of propositi on the basis of etiology

Group	No.	%
Familial	65	10.83
Teratogenic	90	15.00
Syndromes and associated malformations	20	3.33
Sporadic	425	70.84
Total	600	100.00

Information was inadequate in 50 patients who were not included in the analysis.

Development of Maxillary Arch Segments

A cephalometric and dental cast study was conducted on children with this anomaly who had undergone late surgical repair or had not undergone any surgery till the second decade. The study was made on unilateral as well as bilateral cleft lip with palate with regard to different parameters such as masticatory function, speech performance, procumbancy of the pre-maxilla and irregular placement of the teeth²⁵. The arch width, arch length and occlusion relationship of the teeth were also taken into account. These were compared with a matched control group. It was found that the growth and development of the maxillary arch segments in patients who had had late surgical repair was near normal and the occlusion was good in the posterior segments^{26,27}. However, the pre-maxilla in most of the subjects protruded markedly, invariably the surgical repair in these children left an anterior fistula and a short soft palate.

Rehabilitation

The speech was found to be defective and unintelligible in about 90 per cent of the children with complete unilateral or bilateral cleft lip and palate who had undergone late surgical repair or no repair at all. The masticatory function was fair and the children had adapted to deglutition quite well.

Meaningful speech production occurs principally within the pharyngeal, oral and nasal cavities. For the majority of sounds, the nasal cavity and nasopharynx are closed off by the elevation of the soft palate against the posterior wall of the pharynx. The degree of elevation varies between sounds. When the nasal cavity cannot be sealed off during speech, there is a resulting nasal escape

of air and an inability to build up intra-oral pressure. This manifests as improper articulation of speech hence the importance of replacing the missing teeth and reshaping the malformed anterior teeth. The primary objective of using orthodontic prosthesis in velopharyngeal incompetency is to assist the soft palate and the pharynx in the production of good speech.^{28,29}

Children with this anomaly have problems of hypernasality, improper articulation of speech, food and liquids getting into the nasal cavity *etc.* To overcome these problems, different orthodontic appliances have been designed at the AIIMS, New Delhi and these are: (i) feeding appliances with whiskers to be used in early infancy; (ii) obturators for patients with palatal fistulae; (iii) obturator cum partial denture to be used where teeth are also missing along with the presence of fistulae; (iv) expansion appliances for collapsed maxillary arch which restricts tongue space and hampers proper speech performance; (v) retraction of the markedly protruded premaxilla by retraction cum expansion appliances; (vi) appliances for correction of anterior crossbite and rotated incisors; and (vii) speech bulb appliances for patients with short and shrunken soft palate and submucous cleft palate.

All these appliances were planned, devised and prepared indigenously in hot cure polymethyl methacrylate (PMMA) with necessary clasps/attachments. The posterior extension in speech bulb appliances was done in stages. These are the removable non-hinge type of appliances. After the patients have adapted to these appliances, they are given speech therapy with the appliances in position. Patients are required to use these appliances during the day and these could be removed while sleeping. Patients require a three monthly check for changes/adjustments or modifications of the appliances. Proper oro-dental hygiene as well as cleanliness of the appliances are important.

These appliances in conjunction with orthodontic treatment of irregular teeth have given quite satisfactory results in rehabilitating these handicapped children at the AIIMS. This plan of rehabilitation with a minimal input for training of personnel and laboratory facilities can assist in improving upon the functions of speech, deglutition and mastication. This, however, requires collaboration with other members of the cleft palate team.

References:

- Berlin, A.J. Classification of cleft lip and palate. In: *Cleft Lip and Palate*. Eds. W.G. Graff, S.W. Rosenstein and K.R. Bzoch. Little Brown Co. Boston, p.69, 1971.
- Sharma, B., Bajpai, P.C. and Sharma, N.L. Some observations on congenital malformations. *Indian J Pediatr* 39: 286, 1972.
- Kamla, K.G., Raghavendra, V.D. and Krishnamurthy, K.A. Congenital malformations in the newborn in Madurai. In: *Medical Genetics in India*, (Vol.1) Eds. I.C. Verma and R.K. Puri. Auroma Enterprises, Pondicherry, p.53, 1978.
- Puri, R.K., Verma, I.C. and Bhargava, I. Effects of consanguinity in a community in Pondicherry. In: *Medical Genetics in India*, (Vol.2) Eds. I.C. Verma and R.K. Puri. Auroma Enterprises, Pondicherry, p.129, 1978.
- Goravalligappa, J.P. and Nashi, H.K. Congenital malformations in a study of 2398 consecutive births. *Indian J Med Res* 69: 140, 1979.
- Aiyer, R.R. and Agarwal, J.R. Observations on the newborn: A study of 10,000 consecutive live births. *Indian Pediatr* 6: 729, 1969.
- Hemrajani, K.M., Ohri, U.K., Mehta, I.B. and Saxena, S. Congenital malformations in newborn. *Pediatr Clin* 6: 51, 1971.
- Ghosh, S. and Bali, L. Congenital malformations in the newborn. *Indian J Child Hlth* 12: 448, 1963.
- Nair, N.S. and Mathai, N.M. Congenital malformations in the newborn at Calicut—A preliminary report. *Antiseptic* 61: 823, 1964.
- Kolah, P.J., Master, P.A. and Sanghvi, L.D. Congenital malformations and perinatal mortality in Bombay. *Am J Obstet Gynecol* 97: 400, 1967.
- Gupta, B.M., Mathur, H.C. and Sharda, D.C. A study of congenital malformations in central Rajasthan (Ajmer). *Arch Child Hlth* 13: 30, 1971.
- Dash Sharma, P. The incidence of major congenital malformations in Mysore. *Indian J Pediatr* 37: 618, 1970.
- Tibrewala, N.S. and Pai, P.M. Congenital malformations in the newborn period. *Indian Pediatr* 11: 403, 1974.
- Mital, V.K. and Grewal, R.S. Congenital anomalies in neonates. *Indian J Pediatr* 36: 356, 1969.
- Saifullah, S., Chandra, R.K., Pathak, I.C. and Dhall, G.I. Congenital malformations in newborn. A prospective longitudinal study—A preliminary report on 1000 consecutive births. *Indian Pediatr* 4: 251, 1967.
- Khanna, K.K. and Prasad, L.S.N. Congenital malformations in the newborn. *Indian J Pediatr* 34: 63, 1967.
- Singh, M. and Sharma, N.K. Spectrum of congenital malformations in the newborn. *Indian J Pediatr* 47: 239, 1980.
- Singh, M., Jawadi, M.H., Arya, L.S. and Fatima. Congenital malformations at birth among live born infants in Afghanistan—A prospective study. *Indian J Pediatr* 49: 331, 1982.
- Chung, C.S. and Myrianthopoulos, N.C. Racial and prenatal factors in major congenital malformations. *Am J Hum Genet* 20: 44, 1968.
- Neal, J.V. A study of major congenital defects in Japanese infants. *Am J Hum Genet* 10: 398, 1958.
- Grewal, M.S., Sidhu, S.S. and Mehta, S. Genetic studies of cleft lip and palate in north Indian population. *J Indian Orthod Soc* 9: 15, 1978.

22. Grewal, M.S. and Sidhu, S.S. Risks of recurrence and ethnic variations in cleft lip and palate anomaly. In: *Medical Genetics in India*. (Vol.1), Eds. I.C. Verma and R.K. Puri. Auroma Enterprises, Pondicherry. p.59, 1978.
23. Grewal, M.S. and Sidhu, S.S. Cleft lip and palate anomaly—A genetic study. In: *Proceedings of International Symposium on Recent Trends in Medical Genetics*. (first edition). Eds. Marimuthu and P.M. Gopinath. Pergamon Press, Oxford, p.155, 1986.
24. Sidhu, S.S. and Grewal, M.S. Steroid therapy in pregnancy and cleft lip $\pm$ palate anomaly. *Indian Med Gazt* 113: 78, 1979.
25. Bergland, O. and Sidhu, S.S. Occlusal changes from the deciduous to the early mixed dentition in unilateral complete clefts. *Cleft Palate J* 11: 317, 1974.
26. Sidhu, S.S. and Bergland, O. Cranio-facial pattern in boys with unilateral complete clefts at 10-12 years of age. *Trans Eur Orthod Soc* 48: 159, 1972.
27. Sidhu, S.S., Mehta, S. and Grewal, M.S. Changes in dental arches of unoperated adult clefts. *Eur J Orthod* 4: 139, 1982.
28. Sidhu, S.S. History of cleft lip and cleft palate management. *J Indian Orthod Soc* 16: 16, 1986.
29. Sidhu, S.S. and Deshmukh, R.N. Submucous cleft palate anomaly in India—A hospital based study. *J Pierre Fauchard Acad* 1: 61, 1987.

This write-up is based on the M.N. Sen (1987) Oration (of ICMR) delivered by Dr. S.S. Sidhu, Professor & Head, department of Dental Surgery, All India Institute of Medical Sciences, New Delhi; at the 43rd Indian Dental Conference, Pune, (December 29, 1988).

ABSTRACTS

Some Projects Completed Recently

Immunobiological properties of mannophosphoinositides of mycobacteria

The present investigation was undertaken to study the immune responses (both humoral and cell mediated) induced by mannophosphoinositides antigens of mycobacteria; the role of these antigens in affording protection against tuberculosis and the adjuvant effect of other glycolipid antigens in enhancing the protective effect as well as the mechanism of protection.

It was observed that mannophosphoinositides (mannosides), isolated from *M.tuberculosis* H₃₇Rv by thin layer/dry column chromatography, induced significant humoral as well as cell mediated immune response when injected subcutaneously in experimental animals as mannoside-methylated bovine serum albumin (MBSA) complexes emulsified with equal amounts of Freund's incomplete adjuvant. Immunisation with mannoside-MBSA complexes elicited significant protection against challenge with LD₅₀ dose of *M.tuberculosis* H₃₇Rv as revealed by high survival rate, low values of root specific lung weight, lung densities and colony forming units recovered from lung, liver and spleen, as compared to non-immunized group. These observations were further substantiated by histopathological studies. The protective immunity elicited by mannoside-MBSA complexes against challenge with *M.tuberculosis* H₃₇Rv was mediated by the cooperation of T and B cells, as shown by the passive transfer of immune cells/sera into syngeneic sublethally irradiated recipient mice.

Combination of other glycolipids like cord blood factor did not enhance the protective efficacy of mannoside-MBSA complexes.

Although anti-mannoside antibodies did not induce any protection *in vivo* but macromolecular biosynthesis and growth of mycobacteria was partially inhibited in presence of anti-mannoside antibodies *in vitro*.

P.K. Mehta
G.K. Khullar
Department of Biochemistry
Postgraduate Institute of Medical
Education and Research
Chandigarh.

Publications:

1. Mehta, P.K. and Khullar, G.K. Protective immunity to experimental tuberculosis by mannophosphoinositides of mycobacteria. *Med Microbiol Immunol* 177: 265, 1988.
2. Mehta, P.K. and Khullar, G.K. Suppression of macromolecular biosynthesis in *M.tuberculosis* H₃₇Rv by antimannophosphoinositides. *FEMS Microbiol lett* 51: 61, 1988.

Immunological profile of non-cirrhotic portal fibrosis patients

The present investigation was carried out in 43 patients with non-cirrhotic portal fibrosis (NCPF) and equal numbers of patients with compensated cirrhosis of liver and healthy controls matched for age, sex and

socio-economic status, to study the cellular and humoral immunity in NCPF patients and to see whether immunological mechanisms have a role in the pathogenesis of NCPF.

Serum IgA and complement (C_3, C_4) levels were significantly lower in NCPF patients compared with controls and cirrhotics. There was no significant difference between the total quantity as well as the relative concentrations of the immunoglobulins and complements in the circulating immune complexes between NCPF patients and healthy controls, but in patients with cirrhosis concentration of all the immunoglobulins was higher.

The cutaneous response to dinitrochlorobenzene was comparatively poor in NCPF patients, however, the

difference from cirrhotics and controls was not significant. A decrease in the suppressor/cytotoxic (T_8) phenotype of lymphocytes in the peripheral blood and an increase in the ratio of helper/inducer (T_4) and T_8 lymphocytes was seen in NCPF and cirrhotic patients. NCPF patients had a significantly higher frequency of malarial antibody positivity and the antibody titres were significantly higher as compared to controls. Though the results indicate definite immunological abnormalities in NCPF patients, their role in the pathogenesis of NCPF remains obscure.

S.K. Sarin
Department of Gastroenterology
G.B. Pant Hospital
New Delhi

ICMR NEWS

Meetings of the following Project Review Committees (PRCs)/ Expert Group (EG) of the Council were held at New Delhi during the month:

PRC on Cholera and Enteric Diseases	December 12, 1989
-------------------------------------	-------------------

PRC on Environmental & Occupational Health, Biomedical Engineering, Mental Health, Neurology, and Accident, Disability and Rehabilitation	December 12, 1989
---	-------------------

EG of the Task Force Project on Feasibility Module for Dental Carries	December 14, 1989
---	-------------------

PRC on Pharmacology	December 14, 1989
---------------------	-------------------

PRC on Malaria, Filariasis and Kala-azar	December 14, 1989
--	-------------------

*** *** ***

An Indo-US Workshop on Major Advances in Tuberculosis Research was held at Madras (December 4-7, 1989).

The first ICMR Workshop on Preparation of "Good Research Proposals" for submission to various research funding agencies was held one day prior to the XXII Annual Conference of Indian Pharmacological Society, at Calcutta (December 28, 1989).

Participation of ICMR Scientists in Scientific Events:

Dr. S.P. Tripathy, Addl. Director-General, ICMR, participated in the Annual Conference of the Indian

Society of Haematology and Blood Transfusion, at Berhampur (December 1-3, 1989).

Dr. Usha K. Luthra, Addl. Director-General, ICMR, delivered the Sixth Annual State Bank of India Lecture on "Road Traffic Injuries and Deaths in India", at New Delhi (December 1, 1989).

Dr. Kalyan Banerjee, Director, National Institute of Virology, Pune, visited Thailand, South Korea and Japan to study the Control Measures of Japanese Encephalitis (December 4-24, 1989).

Dr. Tripathy participated in the Joint Indo-US Workshop on Major Advances in Tuberculosis Research and chaired a Scientific Session, at Madras (December 4-7, 1989). He also participated in a Workshop on AIDS, at Chandigarh (December 13-15, 1989).

Dr. M.D. Gupte, Dy. Director, CJIL Field Unit for Epidemiology of Leprosy, Avadi, Madras, took up an assignment as a Short-term WHO Consultant on Epidemiology of Leprosy, at Seoul, South Korea (December 10-22, 1989).

Dr. S.P. Pani, Asstt. Director, Vector Control Research Centre, Pondicherry and Dr. V. Kumaraśwami, Senior Research Officer, Tuberculosis Research Centre, Madras, participated in a Workshop on DNA Diagnostics and Filariasis, at Jakarta (December 18-20, 1989).

Dr. Luthra delivered the Keynote address on "Risk Factors Associated with Biological Behaviour of Precancerous Lesion of Uterine Cervix", at the XII Annual Cell Biology Conference, at Hyderabad (December 27, 1989).

ICMR AIDED SYMPOSIA/SEMINARS/WORKSHOPS/COURSES/CONFERENCES

Symposium/Seminar/Workshop/ Course/Conference	Date & Place	Contact Address
IV Workshop and Technology Transfer Programme on Head and Neck Cancer.	December 2-6, 1989; Bombay	Dr. Ashok R. Mehta, President, Indian Society of Head and Neck Oncology, and Surgeon & Chief of Head and Neck Service "C", Tata Memorial Hospital, Bombay.
Seminar on Biochemistry and Modern Biology.	December 4-14, 1989; Lakshadweep	Prof. S.P. Modak, Convenor, Guha Research Conference, Department of Zoology, University of Poona, Pune.
Workshop on Paediatric Urological Reconstructive Surgery.	December 23-25, 1989; Chandigarh	Dr. S.K. Mitra, Professor & Head, Department of Paediatric Surgery, Postgraduate Institute of Medical Education and Research, Chandigarh.
Symposia on Cytogenetics; Plant Cell Biology; Mammalian Systems; and Microbial Systems, and Annual Meeting of the Indian Society of Cell Biology.	December 27-29, 1989; Hyderabad	Dr. M.R. Das, Deputy Director, Centre for Cellular and Molecular Biology, Hyderabad.
XXXIII All India Obstetric and Gynaecological Congress.	December 28-30, 1989; Patna	Dr. J. Mishra, Department of Obstetrics and Gynaecology, Hospital for Women, Patna Medical College, Patna.
Symposium on Current Advances in Molecular Biochemistry: Applications in Health, Environment, and Agriculture.	December 28-31, 1989; Lucknow	Dr. G.G. Sanwal, Professor and Head, Department of Biochemistry, Lucknow University, Lucknow.
III International Congress on Traditional Asian Medicine.	January 4-7, 1990; Bombay	Dr. K.M. Parikh, Chairman, Organising Committee, III International Congress on Traditional Asian Medicine, C/o Zandu Pharmaceutical Works Ltd., Dadar, Bombay.
International Symposium on Updates in Viral Hepatitis.	January 9, 1990; Madras	Dr. S.P. Thyagarajan, Professor and Head, Department of Microbiology, ALM Postgraduate Institute of Basic Medical Sciences, Madras.
Seminar on Indian Speech, Language and Hearing Tests—the proposed ISHA battery.	February 8-9, 1990; New Delhi	Dr. S.K. Kacker, Professor & Head, Department of Otorhinolaryngology, All India Institute of Medical Sciences, New Delhi.
National Symposium on Application of Recombinant DNA Technology in Disease Diagnosis.	March 23-25, 1990; Hyderabad	Prof. P.P. Reddy, Director, Institute of Genetics and Hospital for Genetic Diseases, Osmania University, Hyderabad.
IV National Conference on Biomaterials and Artificial Organs.	April 13-14, 1990; Hyderabad	Dr. Prabha R. Chatterjee, Scientist, Room No.247, Organic Coatings and Polymer Division, Indian Institute of Chemical Technology, Hyderabad.

COUNCIL'S TRAINING PROGRAMMES

Nutrition

At the National Institute of Nutrition, Hyderabad:

... Annual Certificate Course in Nutrition (December 1, 1989 to February 28, 1990).

Haematology

At the Institute of Immunohaematology, Bombay:

... Laboratory Course on Anti-nuclear Antibody (April 9-20, 1990).

COMMUNITY HEALTH CELL
32B, V Main, 1 Block
Koramangala
Bangalore-560034

SOME AVAILABLE ICMR PUBLICATIONS

	Price Rs.
Growth & Physical Development of Indian Infants and Children (1972), Reprinted 1989	10.00
Studies on Weaning & Supplementary Foods (1974), Reprinted 1984	6.00
Studies on Pre-School Children (1974), Reprinted 1984	6.00
A Manual of Nutrition (1973), Second Edition 1974, Reprinted 1984	2.50
Low Cost Nutritious Supplements (1972), Second Edition 1975, Reprinted 1977	1.50
Menus for Low Cost Balanced Diets and School Lunch Programmes Suitable for South India (1959), Third Edition 1977, Reprinted 1984	2.00
Menus for Low Cost Balanced Diets and School Lunch Programmes Suitable for North India (1959), Third Edition 1977, Reprinted 1984	2.00
Some Common Indian Recipes and their Nutritive Value (1964), Fourth Edition 1977, Reprinted 1984, by Swaran Pasricha and L.M. Rebello	6.00
Nutrition for Mother & Child (1962), Third Edition 1978, Reprinted 1983, by P.S. Venkatachalam and L.M. Rebello	5.00
Japanese Encephalitis in India (Revised Edition 1980)	5.00
Some Therapeutic Diets (1969), Fourth Edition 1981, Reprinted 1983, Revised 1988, by Swaran Pasricha	2.00
Recommended Dietary Intakes for Indians (1981), Reprinted 1984	4.60
Lathyrism: A Preventable Paralysis (Revised Edition 1983)	1.50
A Manual of Laboratory Techniques (1983), Edited by N. Raghuramulu, K. Madhavan Nair and S. Kalyanasundaram	30.00
Fruits (1983), by Indira Gopalan and M. Mohan Ram	2.50
Count What You Eat (1989), by Swaran Pasricha	4.50
The Anophelines of India (Revised Edition 1984), by T. Ramachandra Rao	150.00
Depressive Disease (1986), by A. Venkoba Rao	58.00
Medicinal Plants of India, Vol. 2 (1987)	136.00

Unpriced Publications (for limited distribution)

- Collaborative Study on Short-term Sequelae of Induced Abortion (1981)
- Proceedings of the Indo-UK Workshop on Leishmaniasis. (1983)
- Peoples of India—Some Genetic Aspects (1983)
- Management of Acute Diarrhoea (1985)
- Plague Conquest and Eradication in India (1987) by S.C. Seal
- Laboratory Manual for the Diagnosis of Haemophiloid Disorders (1989), by Manorama Bhargava and Dinesh Jain

These publications are available on prepayment of cost by cheque or postal order (bank and postal charges will be extra) drawn in favour of the Director-General, Indian Council of Medical Research, New Delhi. Money orders are not acceptable. All correspondence in this regard should be addressed to the Chief, Division of Publication and Information, Indian Council of Medical Research, Post Box No.4508, Ansari Nagar, New Delhi-110029.

Some available publications of the Institute of Immunohaematology, Bombay

	Price Rs.
Techniques in Blood Banking, by H.M. Bhatia	12.00
Genetic Atlas of the Indian Tribes, by H.M. Bhatia and V.R. Rao	125.00
These publications are available on prepayment of cost by money order or bank draft, from Director, Institute of Immunohaematology, 13th floor, New Multistoreyed Complex, KEM Hospital Campus, Parel, Bombay-400012.	

INDIAN COUNCIL OF MEDICAL RESEARCH

International Research Fellowships of National Institutes of Health(USA)

Applications (on prescribed form) are invited from candidates for award of International Research Fellowships of the National Institutes of Health, USA for specialised training in that country.

ELIGIBILITY REQUIREMENTS

To be eligible for an International Research Fellowship, an applicant must:

1. hold an earned doctoral degree (PhD, MD, DO, DDS, DVM, OD, DPM, ScD, EngD, Dr PH, or DNS) or the equivalent in a health science field at the time of submission of an application to the Nominating Committee;
2. have earned the doctoral degree within 10 years of the application receipt date (should have received their doctoral degree on August 1, 1980 or thereafter);
3. have demonstrated the ability to engage in independent basic or clinical research;
4. submit a research proposal in an area of one of the biomedical or behavioural sciences;
5. have a sponsor in the United States at a nonprofit institution who has agreed to accept the applicant for research on the applicant's proposed project;
6. have assurance from a nonprofit institution in the home country that there is a position to which the applicant can return after completion of the fellowship;
7. be proficient in spoken and written English;
8. should not have been in the United States on J-1 visa for more than two months if they apply for a two year fellowship or for more than 14 months if they apply for a one year fellowship;
9. not be a US citizen or a permanent US resident.

Application forms and details of the fellowship can be obtained before February 20, 1990 from the Director-General, Indian Council of Medical Research (Room No.406), Post Box No.4508, Ansari Nagar, New Delhi 110029. The last date for receipt of completed application form by ICMR is March 5, 1990. Application forms received after the closing date will not be considered.

ICMR BULLETIN SUBJECT INDEX

Vol. 19, 1989

Main Feature	Page No.	Month
A Study on Mental Health Care of the Aged	1	January
Recent Advances in Serodiagnosis of Tuberculosis	11	February
Highlights of ICMR Research on Communicable Diseases (1987-88) Part I	21	March
Highlights of ICMR Research on Communicable Diseases (1987-88) Part II	37	April
Highlights of ICMR Research on Reproductive Biology & Contraception (1987-88)	49	May
Highlights of ICMR Research on Noncommunicable Diseases (1987-88)	61	June
ELISA for the Detection of Cell Membrane Antigens of Spermatozoa	73	July
Intravenous Immunoglobulin Therapy in the Treatment of Idiopathic Thrombocytopaenic Purpura	83	August
Immunology of Solid Tumours and Premalignant Lesions	91	September
Training of Non-Psychiatrist Primary Care Doctors in Psychiatry	103	October
HIV Infection—ongoing Studies and Future Research Plans	115	November
Speech Rehabilitation by Late Surgical Repair in Children with Cleft Lip and Palate Anomaly	135	December

EDITORIAL BOARD

Chairman

Dr. A.S. Paintal
Director-General

Chief, Publications
Dr. G.V. Satyavati

Members

Dr. Usha K. Luthra
Dr. Badri N. Saxena
Dr. S.P. Tripathy

Editor

Dr. N. Medappa