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Below are short overviews of the articles that appeared in this issue of VOLUME:

Australasian Society of Respiratory Technology Inc. – Constitution

This very early document is of particular historical importance because it articulates not only the original governance model but also the aspirations and mindset of our founding members, many of whom remain active members. Apart from the current emphasis on “science” rather than “technology” (now also reflected in our name) our Society’s Constitution remains essentially unchanged. *{The original constitution was cobbled together by Margaret Smith, Judy Roget and David Johns. KG}*

It is particularly satisfying to see that the objectives of the Society (and purpose of the AGM) have survived intact as this testifies to their robustness and relevance. Without restating them in full they embrace the following: **to provide a forum for scientific and technical communication, to advance knowledge, promote excellence and encourage education and training.** These are admirable aims, which have been achieved almost on a daily basis over the years and, hopefully, will continue to be achieved into the distant future. One clause that has never, to my knowledge, been applied is the provision within the Constitution (point 7.1) to eject or penalise a member!

Abstracts of Papers Presented at the 1985 Annual Scientific Meeting of the Australasian Society of Respiratory Technology Inc.

The venue for the 1985 ASM was the Barden Professional Development Centre in Brisbane. This venue was kindly provided by the Queensland Department of Education. Approximately 75 members attended this meeting *{compared with 212 at Canberra this year. KG}* The following twelve papers were presented and show, even in the early days, that there was a diversity of research interests across the membership. I have attempted to summarise each of the studies and from my scanty notes of the meeting try to fill in the odd gap:

1) EFFECT OF CHANGING RIB CAGE / ABDOMINAL CONTRIBUTIONS ON THE ACCURACY OF RESPIRATORY INDUCTIVE PLETHYSMOGRAPHY. C.M. Owen, M.M. Smith and G. Bowes. Lung Function Laboratory, Alfred Hospital, Melbourne, Victoria.

Respiratory inductive plethysmography is a non-invasive and relatively unobtrusive method for measuring ventilation. The method utilises inductive bands placed around the chest and abdomen that provide information about changes in the cross-sectional areas of the chest and abdomen due to ventilation. This study investigated whether changes in the relative contributions of chest and abdomen motion, known to occur across sleep stages, affected the volume accuracy of this technique. Seven healthy awake adult subjects were studied by comparing measurements of tidal volume using a calibrated respiratory inductive plethysmograph (Respirace) with direct measurements of tidal volume obtained simultaneously at the mouth using a rolling seal spirometer. Non-elastic binders were placed around the chest or abdomen to limit the relative motion contributions from the chest and abdomen. The authors found that variations in chest and abdominal contributions produced marked changes in accuracy of tidal volume measurements obtained using respiratory inductive plethysmography.

2) AN EVALUATION OF SPIROMETERS IN CLINICAL USE. J.C. Tomlinson and J.T. Baker. Respiratory Laboratory, Princess Alexandra Hospital, Brisbane, Queensland.

This study assessed the accuracy of 31 wedge-bellows spirometers (Vitalograph) that were in routine use in various settings at four major hospitals in Brisbane. Accuracy was assessed using a 3-L calibration syringe. Accuracy and reproducibility under dynamic flow conditions was assessed using an explosive decompression device (EDDE) to generate reproducible expiratory (exponential) spirograms covering a range of FEV₁ and FVCs. The FEV₁ and FVC measurements from each of the 31 spirometers were compared with values obtained from their laboratory's "gold standard" water sealed spirometer (Godart). Only four of the 31 spirometers met ATS (1979) accuracy limits! Improved accuracy was achieved by performing the following adjustments: pen position (n = 13), micro-switch (n = 11), and position of the bellows (n = 14). The authors concluded that there was a need for greater attention to the accuracy of spirometers in clinical use.

3) A COMPUTERISED SPIROMETER. H. Imberger. Repatriation General Hospital, Heidelberg, Victoria.

This paper described the hardware and custom software used by the author to develop a comprehensive computerised spirometer. The accuracy of the system was assessed against a commercial system (Hewlett Packard pneumotachograph) using reproducible FEV₁, FVC and PEF signals generated by an explosive decompression device. Hennig's computerised spirometer used a Spectrum microprocessor (only 48 Kbytes of RAM!) to process, print and store the raw data from a pneumotach coupled with a validyne DP45 (10 Hz) differential pressure transducer. The bulk of the program was directly written in machine code! Comparison of FEV₁, FVC and PEF data between the computerised and commercial spirometer systems were very close for FEV₁ and FVC. However, the new computerised system tended to produce slightly higher values for PEF – this was not too surprising since standardisation of signal processing for deriving PEF was not well developed in 1985.

4) PRELIMINARY RESULTS OF THE SINGLE BREATH TLCO QUESTIONNAIRE. D.P. Johns, P.D. Rochford and H. Imberger. Respiratory Laboratory, Austin Hospital, Heidelberg, Victoria.

This study reported preliminary results from a 29 item TLCO and VA questionnaire designed to provide information on the range of instruments, methods, quality assurance procedures and predicted values used in Australia and New Zealand. The questionnaire included several sets of raw data from which respondents were asked to compute VA and TLCO. Twenty laboratories in Australia and two in New Zealand responded and the results demonstrated that large differences exist between laboratories with respect to methodology, computation, choice of predicted values and the type and frequency of quality control procedures used. I will be describing the results of this study when I review the December 1985 issue of VOLUME.

5) INTERLABORATORY VARIATION OF THE SINGLE BREATH DLCO. A Outhred, M. Parmentier, D. Silver and R. Simmul. Respiratory Investigation Unit, Royal North Shore Hospital, New South Wales.

In this study, DLCO testing systems in nine laboratories located in Sydney were assessed using a syringe to check inspiratory volume accuracy, and a single gas mixture containing 0.104% CO and 6.3% He to check gas analysis (the relevance of

using this mixture was not described in their abstract). DLCO was also measured at each laboratory on a single human subject to assess the variation in DLCO between laboratories. The authors reported significant variation across laboratories in both the measurement and calculation of DLCO.

6) METABISULPHITE AND SULPHUR DIOXIDE REACTIVITY IN THE ASTHMATIC SUBJECT. D. Allen, J. Delohery and R. Simmul. Respiratory Investigation Unit, Royal North Shore Hospital, New South Wales.

This short abstract review the work done by this group on airway reactivity to the food preservative, sodium metabisulphite. They state that 60% of asthmatic subjects are sensitive to an acid solution of this preservative and that the mechanism is related to the inhalation of sulphur dioxide (SO₂) which is produced when sodium metabisulphite reacts with an acid. This may occur when food containing metabisulphite is ingested where the low pH of the stomach results in the liberation of and potential inhalation of SO₂ into the lungs.

7) PRACTICAL EVALUATION OF NEBULISER – CLINICAL AIR PUMP COMBINATIONS FOR RESPIRATORY AEROSOL THERAPY. D. Schembri, A. Crockett, J. Rowell and G. Henderson. Respiratory Function Unit, Flinders Medical Centre, Bedford Park, South Australia.

The aim of this study was to provide data to assist practitioners in the selection of the most appropriate nebuliser / air pump combinations to ensure adequate aerosol production for therapeutic use. This was a timely study because at the time there was a large number of nebulisers and pumps available separately and *ad hoc* combinations often resulted in low aerosol output, long nebulisation times and inappropriate aerosol particle size. Combinations of six disposable nebulisers and six pumps were studied. The authors recommended particular combinations of nebuliser and pump based on the percentage of a saline solution delivered over a 10 minute period.

8) THE IMPLEMENTATION OF A COMPUTERISED EXERCISE SYSTEM. J. Roget. Lung Function, Alfred Hospital, Melbourne, Victoria.

The aim of this study was to describe a computerised exercise testing system developed by Judy at the Alfred Hospital. The main reason for developing the computerised system was to reduce the time needed to extract, compute, plot the data and produce the clinical report. An LSI 11/23 computer running the RT-11 operating system was used to implement the system. Interpreter type programs were written using DAOS which supported the foreground/background features provided by RT-11. All sampling was carried out at 20 samples per second. The custom system was validated against the laboratory's standard manual system and the results were presented in another paper presented at this meeting (reported in the following abstract). The author concluded that her computerised system dramatically reduced the time taken to complete a progressive exercise test.

9) VALIDATION OF A COMPUTERISED EXERCISE SYSTEM. J. Roget and M. M. Smith. Lung Function, Alfred Hospital, Melbourne, Victoria.

The authors compared the results obtained using their laboratory's standard manual exercise testing system with those obtained using the computerised system they developed at the Alfred Hospital (see previous abstract). Six healthy subjects and three patients performed a progressive cycle exercise test on each testing systems

(time interval between the two exercise tests was not stated). Comparison of test results was performed over the following ranges: workload 100-1400 kpm/min; heart rate 68-188 beats/min; expired ventilation 13-118 L/min; breathing frequency 10-56 per minute; oxygen uptake 385-2707 ml/min. The authors concluded that the differences between the computerised and manual methods were acceptable. I recall that following this validation study the computerised system implemented as their standard laboratory method.

10) THE ROLE OF THE RESPIRATORY TECHNOLOGIST IN ASTHMA EDUCATION. J.G. Shaw, M.M. Budge, P.V. Zimmerman. Respiratory Investigation Unit, The Prince Charles Hospital, Queensland.

The authors surveyed 50 asthmatic inpatients to determine areas where asthma education could be most useful. The authors found that despite receiving instructions on how to correctly use their metered dose inhaler, 40% of patients used an inadequate technique and many did not have adequate knowledge regarding their therapy. The authors concluded that it would be appropriate for laboratory staff to be directly involved in patient education, especially reinforcing knowledge about therapy and checking and providing feedback on the patient's aerosol delivery technique.

11) METHACHOLINE CHALLENGE USING AN ULTRASONIC NEBULISER AS A DELIVERY SYSTEM. M.P. Graves, D.E. Stewart. Respiratory Physiology, Princess Margaret Hospital, Christchurch, New Zealand.

The authors assessed the reproducibility of a methacholine challenge test using a custom high frequency ultrasonic nebuliser constructed from equipment generally commonly available within hospitals. They performed methacholine challenge tests on 25 asthmatic subjects on two occasions separated six weeks apart. Each subject inhaled a single vital capacity breath of the aerosol and then held their breath for 5 seconds. Spirometry was performed 4 minutes after each dose. The 95% confidence interval for the difference between repeat tests was 3.35 doubling doses. The authors concluded that the reproducibility of their method compared favourably with other ultrasonic methods.

12) THE EFFECT OF INSPIRATORY MUSCLE TRAINING ON EXERCISE CAPACITY IN PATIENTS WITH SEVERE STABLE CHRONIC AIRFLOW LIMITATION. C.A. Kelly, J.L. McKeon, A.G. Dent, P.V. Zimmerman. Respiratory Investigation Unit, The Prince Charles Hospital, Queensland.

The authors studied 18 patients with severe stable airflow limitation over a period of six weeks. The patients were divided into two groups: the first group (10 patients) underwent inspiratory muscle training using a device with a high inspiratory flow resistance; the second group (8 patients - controls) used a low resistance (presumably) device (placebo). The authors found that whilst all patients using the muscle training device improved their tolerance of inspiratory resistance, there was no significant improvement in either maximal inspiratory pressure or exercise capacity. They concluded that inspiratory muscle training did not offer improved exercise capacity in patients with severe stable chronic airflow limitation.

Mouth-Piece

An interesting letter was published by Dr Margret Smith (Alfred Hospital, Melbourne). Dr Smith (an avid supporter of our Society over many years) responded

to Dr Charles Castle letter to this journal (published in December 1984), in particular his hypothetical patient and the schema he proposed. Dr Smith comments on the “match test”, peak flow, quality control of instrumentation, the Howell stress test, histamine challenge test, estimation of arterial PCO₂, and exercise testing, and commented on what the general practitioner wants to know: “Is something wrong with his patient?”, “What is wrong?”, and “Has there been any change?”.

Six References of Interest were posted, three on the hot topic of 1985, domiciliary oxygen therapy.

Please contact me if you are interested in a copy of this or any other issue of VOLUME.

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