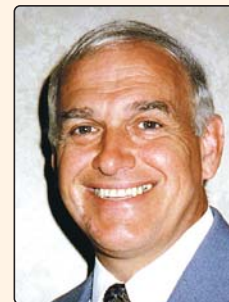


# FUNDAMENTALS OF MECHANICAL VENTILATION

Reviewed by Ken A Wyka, MS, RRT



In this issue, I am privileged to review *Fundamentals of Mechanical Ventilation* (a short course in the theory and application of mechanical ventilators) by Robert L. Chatburn RRT.

This is another "small" book that is big in content. I must say that I was quite impressed with the depth the book goes into regarding the concepts of mechanical ventilation. The book is 294 pages long, including index and order form, and is available only in paperback. The price is \$59.95. As with other things in life, the buyer must weigh value versus price and I believe value definitely wins out here.

*Fundamentals of Mechanical Ventilation* is presented in a unique format. There are five major sections that have a generous amount of self-assessment questions in the form of true and false and multiple choice. Definitions and key ideas are presented throughout these five sections. There are also three appendices that include answers to the self-assessment questions, a glossary and a mode concordance. The text is peppered with figures and tables to illustrate and expand the information presented. Naturally, there are more figures in the section on waveforms and on how to read graphic displays.

With this brief introduction, let's take a look at the book's actual content. Section 1 deals with an introduction to ventilation and is as basic and simple as you can get. It presents a clear, easy to follow description of breathing. In fact, you may get the impression that this text is too easy. What would you think about a book that begins, "During breathing, a volume of air is inhaled through the airways into millions of tiny gas exchange sacs deep within the lungs."? Don't be fooled; the water gets deeper, and very quickly. Section 2 is an introduction to ventilators and focuses on ventilator types, patient interfaces, power sources, control systems and patient monitoring. Again, this section is basic with the author attempting to establish a firm foundation for the reader. As with section 1, definitions and key ideas are presented along with self-assessment questions. By the way, the first two sections only use 16 pages of text. Remember, there are 294 total pages.

The book becomes more detailed with section 3. This section examines how ventilators work in terms of power input, control systems, modes of ventilation and alarm systems. It is in this section that an "extra for experts" feature first appears providing additional information and taking essential concepts discussed to the next level. Now the text reads, "It also ignores inertia (the constant of proportionality between pressure and the rate of change of flow) because the inertia of the gas, lungs, and chest wall are insignificant at normal frequencies." This is significantly different from the opening sentence of the book. Another feature presented in this section is "review and consider". Here the reader is asked to stop and answer a series of review questions to reinforce the material covered. The author also presents a number of equations/algorithms along with thorough explanations of their clinical application to mechanical ventilation.

Section 3 focuses on cycle variables such as pressure, volume, flow and time; baseline variables (PEEP and CPAP) and presents a brief introduction into the different modes of mechanical ventilation. Section 4 takes a more in-depth look on how to use these various modes and covers concepts such as time constants, pressure control and dual control. It is here that the reader begins to experience the true substance of the book. I assure you, this section will clarify and expand your concept of ventilatory control modes.

The largest section of the book is Section 5 dealing with reading graphic displays. Many state and national conferences offer presentations on this very topic. The author does an excellent job in explaining the various waveforms associated with mechanical ventilation. Some of the topics considered include a rapid interpretation of graphic displays, the basics of waveform displays, predicting the effects of changes in respiratory system mechanics using waveforms plus the waveforms associated with different types of mechanical ventilators, control modes and ventilatory parameters. Of special interest is the author's discussion of time constants, pressure-time product, occlusion pressure, the rapid shallow breathing index and AutoPEEP as they apply to graphic displays. Be warned, there is some math in this section and if math is not your forte, you may need to spend a little more time digesting the information presented. Nonetheless, this section of the text is excellent in terms of its content and scope.

The book concludes with three appendices, the answers to self-assessment questions, a glossary and a mode concordance. For those not familiar with this term, the mode concordance is presented as a chart depicting ventilator manufacturers with their ventilator models and corresponds them to the names of common modes of ventilation (used by each manufacturer) with various breathing pattern classifications. The reader should find this tool very, very helpful.

Overall, I found *Fundamentals of Mechanical Ventilation* a very well written and presented text. It will serve as a welcomed addition to any departmental or personal library. The self-assessment questions are excellent and add to the value of this book. Students will find this book useful in understanding the concepts of mechanical ventilation and I encourage educators to closely examine this text and give it serious consideration for course adoption.

Based on content, writing style, appropriateness and overall readability, I rate this text: 🐻 🐻 🐻 🐻 (out of a possible four lungs):

*Fundamentals of Mechanical Ventilation* by Robert L. Chatburn RRT is in its first printing (2003) and is published by Mandu Press Ltd., P.O. Box 18284, Cleveland Heights, OH 44118-0284. The ISBN is 0-9729438-2-X and it is available at a price of \$ 59.95.

