

Tube-fed patients may be suffering due to the lack of physical activity

Impact of Physical Activity for Tube-fed Patients

The past decade has brought a new perspective to physical activity by moving the focus from vigorous exercise to a broader range of health-improving physical activities, even for people with chronic illnesses and disabilities. In 1996, the Surgeon General released a comprehensive report on the health benefits of physical activity. This report found that regular physical activity can help people with chronic, disabling conditions improve their stamina and muscle strength, can improve psychological well-being, combat depression and can positively impact quality of life.¹ This report is significant because it illuminates the link between health and the benefits of physical activity.

The Surgeon General found that people with disabilities and poor health are much less likely to participate in regular, moderate physical activity, yet they have similar needs to participate in physical activity as those without disabilities.¹ Published clinical research focusing solely on the benefits of physical activity for a tube-fed patient does not yet exist; however, based on the findings of the Surgeon General, one can make the association that physical activity is a key to health-related quality of life for the enteral nutrition consumer.

Major findings conclude that people who are usually inactive can improve their health and well being by becoming even moderately active on a regular basis.¹ Additionally, physical activity need not be strenuous to achieve health benefits.¹ Regular participation in physical activity has been shown to reduce depression and anxiety, improve mood, and enhance ability to perform daily tasks throughout the life span.¹ Physical activity contributes to improved health-related quality of life by enhancing psychological well-being and by improving physical functioning in persons compromised by poor health.¹ The report urges "health care providers to talk routinely to their patients with disabilities about incorporating physical activity into their lives."¹

In the foreword to the Surgeon General's report, the Director of the CDC, the Assistant Secretary for Health and the Co-Chairs of the President's Council on Physical Fitness and Sports summarize by saying, "Increasing physical activity is a formidable public health challenge that we must hasten to meet. The stakes are high, and the potential rewards are momentous; preventing premature death, unnecessary illness, and disability; controlling health care costs; and maintaining a high quality of life into old age."¹

Objectives of This Report

There are two primary objectives of this report. The first is to understand the issues with the most commonly used enteral feeding pumps, including why they limit patients', and in some cases, caregivers' ability to be physically active. The second is to describe a new technology in enteral feeding pumps that has been introduced to address many of the current issues and to provide more freedom to pursue physical activity.

Profile of Home Enteral Nutrition Consumers

Tube-fed patients often receive their feedings at home; in the USA alone, more than 344,000 individuals of all ages receive home enteral nutrition. According to a 2002 clinical review in the *Journal of Parenteral and Enteral Nutrition* (the Journal), the general consensus is that the number of home enteral nutrition consumers continues to rapidly grow.² An additional clinical review in the Journal examined the profile of home enteral nutrition consumers cared for by a national home infusion provider. Of the 5,486 patients under the

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provider's care, 36 percent were considered pediatric (0 to 16 years of age) and 29 percent were considered geriatric (greater than 65 years of age).³ This indicates that 45 percent of the patients were adults (17 to 65 years of age). The top five diagnoses for this group of patients were: (1) gastrointestinal symptoms, (2) protein calorie malnutrition, (3) nutritional/metabolic/developmental syndromes, (4) intestinal malabsorption, and (5) disease of the esophagus.³

A study that followed 416 adult patients found that after initiating tube feeding, only 13 percent were transitioned back to oral feeding.² This finding speaks to the fact that once a patient is discharged to their home with a feeding tube, their chances of returning to oral feeding are low.

When a patient transfers home with a feeding tube, many issues arise that the patient and their caregivers must resolve. In 2002, Silver and Wellman reported that many patients receiving enteral feeding at home rely on support from family caregivers, such as immediate family members and relatives.⁴

This group of caregivers voluntarily manages and monitors the majority of the daily care.⁴ Not only is the physical activity of the consumer impacted by their enteral feeding equipment, the ability of the caregiver to transfer the patient to and from school, work and play is also affected.

Understanding the profile of home enteral nutrition consumers may help the prescribing physician gain a better understanding of how they can help enable their patients to reach an appropriate level of physical activity.

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Enteral Feeding Pump Technology

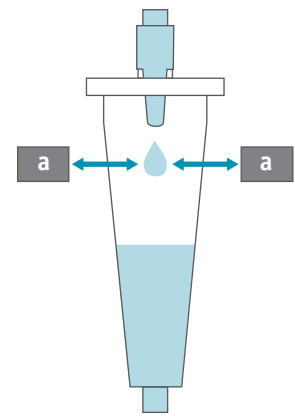
Recognizing that home enteral nutrition consumers who utilized a feeding pump to deliver their food needed a pump that was not permanently affixed to an IV pole, a pump was introduced in 1991 that could be placed in a carry pack and transported by the user. A key feature of this pump was its use of a fluid delivery set that incorporated a drip chamber. The pump monitors drops in the drip chamber to sense flow and blockages. By utilizing this type of gravity based sensing mechanism, this pump operates reliably only in an upright position.

This requirement to remain upright severely restricts many of the simplest physical activities that a patient may want to perform while receiving enteral feeding. Yet, feeding pumps that utilize drip chambers are the most commonly used feeding pumps in the home care setting, even for patients deemed ambulatory by their prescribing physician.

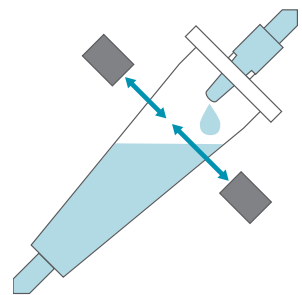
The Patient's Perspective

In 1997, the Oley Foundation published an article for consumers of home enteral therapy.⁵ The Oley Foundation is a national, non-profit organization that provides information and support for consumers of home enteral and parenteral nutrition, their caregivers and clinicians. This article reviewed some of the major concerns of home enteral nutrition consumers and was based on a focus group of home enteral patients conducted in September 1997. Portable feeding pumps are described as helping a consumer become more comfortable and accepting of their situation. The difficulty of scheduling daily activities around infusion schedules is described relative to the positive impact of a portable pump.⁵ The challenges faced by home enteral nutrition consumers in maintaining the most physically active life possible for them are far more than convenience issues. Mobility and physical activity can significantly impact many aspects of their health and quality of life.

"Having a portable (vs. pole-mounted) pump and more instruction on using it, can go a long way towards making a consumer more comfortable and accepting of their new situation."⁵



Sensors in the pump (marked 'a') detect drops falling through the drip chamber. These drops are then counted and metered in order to control flow rate and detect occlusion.



If drip chamber is tilted (in this case 45°), the sensors cannot detect any drops falling. Sensors may also become covered by fluid present in the drip chamber. This results in pump errors and the pump will stop operating.

"Another challenge for [home enteral nutrition] consumers is adjusting their daily life to fit with their infusion schedule. For consumers who don't have a portable pump, or if for another reason it's impractical to infuse publicly, the need to be at home during the day or evening can put a real cramp in their social and business life."¹⁵

From this article, it is clear that patients recognize that the type of feeding pump they use limits their personal freedom and their ability to be physically active.

Innovative Technology Addresses the Needs of Enteral Feeding Patients

A truly portable, easy-to-use, enteral feeding pump eliminates restrictions on the ability to be physically active. This active freedom results in true health benefits. A pump that offers sophisticated, yet simple-to-use, technology can reduce caregiver burden significantly, improving the quality of life for both consumer and caregiver.

Tube feedings affect health and quality of life, and in very specific ways. Therefore, devices that do not limit physical activity can improve quality of life. To address this need, ZEVEX entered the enteral pump market in 1996 by introducing the EnteraLite® Ambulatory Enteral Feeding Pump. The EnteraLite won a medical design excellence award and was awarded the seal of acceptance from the Children's Health Corporation of America. EnteraLite's performance specifications related to accuracy, flow rate range, ease-of-use, and battery life remain unsurpassed in the industry. The EnteraLite was the first technology of its kind to provide the important benefits of a truly ambulatory enteral feeding pump including elimination of the drip chamber from the disposable set. Building upon the clinical success of the EnteraLite, ZEVEX is now introducing its next generation enteral feeding pump, the EnteraLite Infinity™.

How the EnteraLite® *Infinity*™ Works

Even when the tube-fed patient is active and moving, the EnteraLite Infinity continues to operate reliably, in any orientation. Breakthrough technology in the EnteraLite Infinity allows the user to carry the pump with them during all activities, including work, school and play.

New, patented technology from ZEVEX uses light waves to monitor pump operation, including the presence of air in the tubing or blockages. This new sensing technology does not require the use of a drip chamber. The user is able to prime the food delivery set, removing all of the air from the system. By doing so, the pump and feeding solution can be placed in a carry pack, which can then be worn by the user and placed in any orientation.

The EnteraLite Infinity utilizes a proven rotary peristaltic pumping mechanism that is able to maintain accuracy of +/- 5 percent of the programmed flow rate. This highly reliable pumping mechanism is able to maintain accuracy over a flow rate range of 0.1 ml/hr to 600 ml/hr, ensuring the patient receives the prescribed amount of calories and nutrition. Programming a feeding is simple and can be easily handled by the caregiver, freeing them to focus on the other aspects of care.

ZEVEX has miniaturized many of the components required for the accurate delivery of enteral nutrition, resulting in a feeding pump that weighs less than 15 ounces. In addition to its small size and light weight, the EnteraLite Infinity has a rechargeable internal battery that enables the pump to operate on battery power for 24 hours at a flow rate of 125 ml/hr, further expanding the user's freedom to participate in an active daily schedule while feeding.

Impact of the EnteraLite® *Infinity*™

With ZEVEX technology, traditional limitations to physical activity that were an accepted part of home enteral nutrition are now eliminated. The elegantly simple EnteraLite Infinity answers the need of home enteral nutrition consumers to participate in physical activity. This new technology from ZEVEX allows the user to easily transport their pump with them. The use of a feeding pump no longer needs to be a major limitation to the patient's daily schedule.

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Summary

An applied nutritional investigation in the journal *Nutrition* summarizes the issue well, "the most common goal for a patient at advanced stages of chronic disease are palliation of severe symptoms and discharge from a hospital to a regimen of home care."⁶ Home enteral nutrition can best support both of these goals when the therapy does not place unnecessary limitations on the patient's ability to be physically active. True portability removes barriers to physical activity.

ZEVEX pioneered the first truly ambulatory enteral feeding pump that combined superior accuracy and ease-of-use with the ability to operate in any orientation. Today, ZEVEX is continuing in its mission to impact clinical outcomes positively through the development of new technology by introducing the next generation in truly ambulatory enteral feeding pumps, the EnteraLite Infinity.

Prescribing physicians can now help their patients gain the benefits from health-improving physical activity by enabling them with new technology that supports active freedom.

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This is the first in a series of white paper reports prepared by ZEVEX Incorporated to introduce our next-generation enteral feeding technology developed to address the needs of enteral pump consumers.

For more information, including the complete specifications of the EnteraLite Infinity, please contact ZEVEX Customer Service at 1-800-970-2337, or visit our website at www.zevex.com.

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