HHS Public Access

Author manuscript

Am J Safe Patient Handl Mov. Author manuscript; available in PMC 2022 April 06.

Published in final edited form as:

Am J Safe Patient Handl Mov. 2016 June ; 6(2): 47–48.

Revisiting the Limits of the 35 Pound Limit

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"The 35 lb limit." That phrase has no meaning to the general public, yet it's instantly recognized by SPHM professionals as an important weight limit for manually lifting a patient without mechanical assistance. Several years ago, Dr. Thomas Waters published an article[1] describing how he derived the 35-lb limit, for a limited range of patient handling tasks, using the Revised NIOSH Lifting Equation (RNLE) [1–3].

We were both colleagues and friends of the late Dr. Thomas Waters. We were saddened by Tom's retirement from NIOSH and utterly dismayed by his early demise. His work in developing and revising the NLE was seminal in the field of manual materials handling, and Dr. Waters' application of the RNLE for patient handling has had a tremendous impact. Over the years, "the 35-pound limit" has become a common phrase in the SPHM vernacular. However, the narrowness of the range of patient handling tasks that yields 35 lb as a limit is acknowledged much less frequently. Moreover, although Waters' specific application of the NIOSH equation resulted in a maximum recommended weight limit of 35 lb for patient handling, NIOSH has not established 35 lb, or any other weight, as a policy-based limit for manual patient handling.[4] Thus, we are writing this document to revisit the "limits" of the 35-lb limit.

As described by Dr. Waters,1(pp55) the RNLE yielded a 35-lb maximum weight limit under the assumption of "ideal" lifting conditions, explaining that the equation yields lower weight limits under conditions involving added risk factors, "such as lifting with extended arms, lifting when near the floor, lifting when sitting or kneeling, lifting with the trunk twisted or the load off to the side of the body, lifting with one hand or in a restricted space, or lifting during a shift lasting longer than eight hours."

One scenario that can be imagined to exemplify ideal conditions is lifting a patient's leg during surgery, provided the healthcare worker is able to lift the leg using both arms without bending, reaching or twisting. According to Waters' application of the RNLE,1 given these "ideal" conditions, the leg would be safe to manually lift if it weighed 35 lb or less. However, if the healthcare worker needed to extend his or her arms during the lift, the 35-lb result would not apply. The equation's resulting recommended weight limit would be lower, due to increased biomechanical risk quantified in the equation's model as increased horizontal distance between the lifter and the patient. In using the RNLE approach, each departure from ideal lifting conditions in the form of added biomechanical risk factors effects a lowering of the resulting recommended weight limit.

In addition to pointing out that added risk factors result in decreased recommended weight limits, Dr. Waters noted that if the patient is combative or unpredictable, the RNLE cannot be applied at all because it does not account for unpredictable changes in risk factors such as shifts in the load during lifting.1 When the RNLE was first published, the lifting of people was explicitly excluded from suggested applications of the equation because of that unpredictability.[2] Consequently, application of the RNLE to patient lifting and handling tasks has never been officially recommended by NIOSH as a matter of policy,[4] despite widespread assumptions to the contrary.

The large majority of patient handling situations involve weights heavier than 35 lb. Some situations such as the lifting of body parts in surgical settings represent the most likely exceptions for which direct application of the RNLE might be appropriate. Not coincidentally, that purpose was a focus of Dr. Waters' initial efforts in healthcare applications of the RNLE, when he began collaborating to develop ergonomics guidelines for the Association of periOperative Registered Nurses (AORN). Those types of situations comprise a small segment within the general scope of patient handling, and "ideal conditions" for manual patient handling are rare. Accordingly, we, along with many other researchers and SPHM professionals, agree with Fragala's[5] statement that "in most all situations safe patient handling technology should be used to lift, laterally transfer or reposition dependent care recipients."

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