

Benefits Achieved for Patients Through Application of Height-Adjustable Examination Tables

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Abstract

Objectives: Ambulatory care is a rapidly growing segment of overall healthcare delivery and populations seen in ambulatory care settings are aging resulting in many patients with mobility limitations. Mounting a fixed height examination table can present a challenge to a patient with mobility limitations and may be somewhat difficult for the general patient population. This study sought to investigate potential benefits to the patient which might be achieved through introduction of height adjustable examination tables. **Methods:** A data collection tool was administered to patients at the time of a regularly scheduled clinic visit intended to measure exertion required, level of difficulty and feeling of safety. **Results:** Both patients requiring assistance and independent patients reported higher exertion, more difficulty and feeling less safe when mounting higher fixed height versus height adjustable examination tables. **Conclusions:** Height adjustable examination tables provide benefits to patients and should be considered when seeking furnishings for ambulatory care clinics.

Keywords

outpatient clinic, patient safety, patient perspective, patient accessibility

Introduction

Traditionally, examination tables have been a fixed height and are actually referred to as box-type tables. The normal height of a standard fixed-height examination table has been about 32 inches (81.28 cm). Consider this height of 32 inches versus the height of a common chair seat which is approximately 18 inches (45.72 cm) and the difficulty a patient might have to try and get up on that fixed-height examination table. A patient who has any mobility limitations would have even more difficulty trying to mount a fixed-height examination table and may not be able to get up onto the table. When the height of an examination table or a diagnostic chair is high and not adjustable, wheelchair users and people with other activity limitations who cannot mount the table may need to be lifted or assisted onto this equipment. Even a patient who is relatively independent might encounter difficulty and require assistance when attempting to get up onto a surface that is 32 inches high. Figure 1 illustrates how a patient while in a seated position on a fixed-height examination table is not able to place their feet comfortably on the floor. Considering the obstacle presented to patients related to attempting to get up on to a fixed-height examination table that is at a relatively high height of 32 inches, adjustable height examination tables capable of achieving

a low height in the range of 18 inches seem to remove barriers to access and be a more desirable option. Beyond the benefits to the patient which facilitate access to the exam table, when the patient is on equipment with an adjustable height feature, it also enables health-care providers to elevate the equipment to a comfortable height and be in a better posture for conducting an examination or procedure, thus enhancing the ability to deliver a higher quality of care to that patient. If a health-care provider is required to reach and bend while conducting an examination or a medical procedure, they can be placed in an uncomfortable or awkward posture that can lead to fatigue and might contribute to an occupational cumulative trauma disorder. Figure 2 illustrates how using exam table adjustment features a patient can be placed in a better position to facilitate an examination or a procedure by a health-care professional.

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Figure 1. Difference in foot position with relation to floor comparing fixed-height and height-adjustable examination table.



Figure 2. Patient on height-adjustable table that can be raised and lowered for caregiver ease of access during examination or procedure.

Fixed-height examination tables that limit and restrict patient access can in fact have a negative impact on the quality of care a patient receives. In a survey, administrators were asked if parts of an exam were skipped when a barrier to service was encountered when examining a patient with disabilities. Forty-four percent of the administrators acknowledged that parts of an exam were skipped when a barrier was encountered. Practice administrators were asked what alternatives were used if a patient was not able to transfer onto an exam table. Seventy-six percent of practice administrators indicated that patients were examined in their wheelchairs when they cannot transfer onto an exam table: 52.4% of practice administrators reported asking patients to bring someone with them to help with a lift and/or transfer if required. Seventy-seven percent of practice administrators indicated that their employees were trained to lift a patient whereas only 4.8% of practices have a mechanical lift available to transfer patients (1).

When a physician is unable to perform an appropriate examination because a patient cannot get onto an examination or procedural table or chair, the patient may receive a lesser

quality of health care. The patient might be misdiagnosed because the physician may not have sufficient information. Alternatively, the patient might miss the benefit of early detection of a serious developing condition. By providing accessible examination tables, physicians improve the quality of care provided to people with disabilities and activity limitations. The use of an accessible exam table may also reduce the frequency and time required in using a lift team, lift equipment, and/or providing transfer assistance from staff (2).

In addition to improving quality of care, providing height-adjustable examination tables for patients who have limitations with mobility may soon become a legal requirement. The "Patient Protection and Affordable Care Act" added an amendment to Section 510 of the Rehabilitation Act that authorized the US Access Board to develop accessibility standards for medical diagnostic equipment (MDE) in consultation with the Food and Drug Administration. While the proposed standards are not yet enforceable as federal regulations, they provide "best practice" guidance for specifying and acquiring accessible MDE.

The proposed standards for MDE apply to equipment that includes examination tables, examination chairs (including chairs used for eye examinations or procedures, and dental examinations or procedures), weight scales, mammography equipment, X-ray machines, and other radiological equipment commonly used for diagnostic purposes by health professionals. The proposed standards establish minimum technical criteria that will allow patients with disabilities independent entry to, use of, and exit from MDE to the maximum extent possible (3). Although final standards have not yet been implemented, there have been some high-profile Department of Justice legal cases where it was determined to be a violation of Americans with Disabilities Act (ADA) requirements when height-adjustable examination tables were not available to persons with mobility disabilities (1).

Although height-adjustable examination tables make sense, they are currently lacking in the majority of sites. In fact in a survey done in California, it was found that only 8.4% of provider sites had a height-adjustable examination table (4).

Investigating the Problem

In order to study the potential benefits achieved for the patient in the ambulatory care environment through the introduction of height-adjustable examination tables, an experiment was conducted comparing exertion required to get up onto a fixed-height examination table versus getting onto an examination table capable of achieving adjustable heights. Measuring perceived physical exertion has been shown to be an effective technique used in clinical studies to investigate patient abilities and difficulty encountered in completing an activity (5). Studies performed in controlled laboratory settings have demonstrated a close relationship between perceived physical exertion and work demands expressed as a percentage of the individual physical capacity. This has been observed both in

Survey to Investigate Patient Perceived Feelings Getting Onto Exam Table

Date _____ Location _____ Age _____ Gender _____

CIRCLE THE APPROPRIATE RESPONSES BELOW

EXAM TABLE TYPE: FIXED HEIGHT or HEIGHT ADJUSTABLE

Physical abilities: 1. I am fully INDEPENDENT

2. I require MINIMAL assistance to walk and/or transfer in/out of a chair

3. I require a SIGNIFICANT amount of assistance to walk and/or transfer in/out of a chair

4. I am wheelchair bound

Rate the ENERGY/EXERTION required to get up onto the examination table (i.e if your heart rate went up or if you got short of breath?)

- | | |
|-----|---------------------------|
| 0 | Nothing at all |
| 0.5 | Very, very light |
| 1 | Very light |
| 2 | Fairly light |
| 3 | Moderate |
| 4 | Somewhat hard |
| 5 | Hard |
| 6 | |
| 7 | Very hard |
| 8 | |
| 9 | |
| 10 | Very, very hard (Maximal) |

Rate how difficult it was for you to get onto the examination table. Was it very easy or extremely hard and difficult?

- | | |
|-----|--------------------------------|
| 0 | No problem at all |
| 0.5 | Very, very easy |
| 1 | Very easy |
| 2 | Fairly easy |
| 3 | Moderate |
| 4 | Somewhat difficult |
| 5 | Difficult |
| 6 | |
| 7 | Very difficult |
| 8 | |
| 9 | |
| 10 | Very, very difficult (Maximal) |

Safety: How safe did you feel when you got onto the examination table? Did you feel very safe or were you concerned that you might fall?

- | | |
|-----|-----------------------------|
| 0 | No safety concerns at all |
| 0.5 | Very, very safe |
| 1 | Very safe |
| 2 | Fairly safe |
| 3 | Moderate |
| 4 | Somewhat unsafe |
| 5 | Unsafe |
| 6 | |
| 7 | Very Unsafe |
| 8 | |
| 9 | |
| 10 | Very, very unsafe (Maximal) |

Figure 3. Data collection tool.

terms of objectively assessed cardiovascular (6,7) and muscular work load (8,9). The validated Borg Scale for Perceived Exertion was used to evaluate patient subjective physical exertion required to complete the task of getting up and onto an examination table. This instrument uses a 10-point scale ranging from 0 = no exertion to 10 = extremely hard exertion (10,11). Reliability and validity of the Borg scale have been previously published (10,11). Additionally, subjective ratings were deemed appropriate for this study for several reasons, including the simplicity of the tool and the ability to administer it consistently at various data collection sites. The Borg Scale for Perceived Exertion instrument is also frequently used by ergonomists and has been widely accepted in the ergonomics field (12).

In addition to measuring perceived physical exertion as reported by the patient, other factors relating to the patient's well-being were evaluated. These factors included patient safety that considered patient risk of falling when attempting to mount the examination table and perceived difficulty encountered by the patient when mounting examination tables of different configuration. A similar 10-point scale was used to measure safety and difficulty. In addition to a question measuring perceived physical exertion, 2 additional questions were asked which were: Rate how difficult it was for you to get onto the examination table. Was it very easy or extremely hard and difficult? How safe did you feel when you got onto the examination table? And, did you feel very safe or were you concerned that you might fall? The data collection tool for this study was derived from a tool used in a previous study by the author (13). The data collection tool used in this study is illustrated in Figure 3. Since the study was to be conducted in multiple locations and additional data sets might be collected in future studies, a written survey tool was determined to be the best method for data collection.

This study was conducted in actual clinical settings where patients were being examined as part of a scheduled medical visit at an ambulatory care clinic. Patients were asked to complete the data collection form immediately after their examination. The completed survey forms were sent to the principal investigator for review and analysis. To better study the impact of height-adjustable exam tables, different patient mobility levels were considered. Patients were asked to indicate their physical ability at 1 of 4 different levels that were (1) fully independent, (2) requiring minimal assistance to walk and/or transfer in/out of chair, (3) requiring significant amount of assistance to walk and/or transfer in/out of a chair, and (4) wheelchair bound. Patients were also asked to indicate their age and gender.

The research question for the study is as follows: When a patient attempts to get up onto an examination table that is adjustable, capable of achieving varying heights from the floor surface to accommodate the specific patient, versus an examination table with a fixed height of approximately 32 inches, less perceived physical exertion will be required. Less perceived physical exertion translates into less difficulty and a better overall experience for the patient including feeling safer.

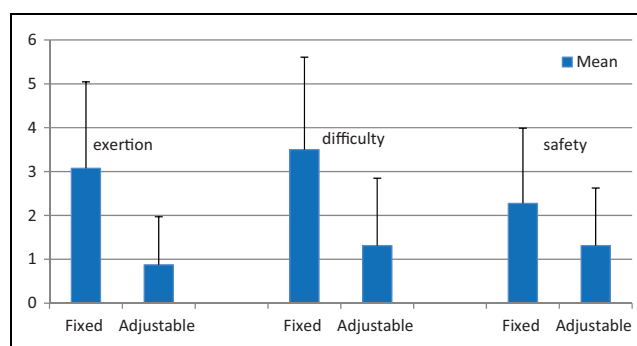


Figure 4. Comparison of means for reported exertion, difficulty, and safety for patient requiring minimal assist.

Results

A total of 473 data collection forms were completed with a breakdown of results in mobility status as: 304 independent, 28 requiring minimal assist, 9 requiring significant assist, and 7 wheelchair bound. There were an additional 125 forms recorded as not applicable, where the patient did not mount an examination table during the appointment. In some cases, the patient may not have attempted to mount the examination table because of the difficulty involved, but there is not sufficient information available to confirm this.

The results in the Minimal Assist category provide some good information to evaluate what benefits might be achieved for a patient when a height-adjustable examination table is available. The mean or average was calculated for each of the 3 measures on the data collection form yielding the following results as displayed in Table 1. Of the 28 patients in the Minimal Assist category, 21 mounted fixed-height tables and reported exertion at 3.075 (1.970), difficulty at 3.500 (2.110), and safety at 2.271 (1.713). With the 7 patients who were able to use an adjustable table, exertion was reported at .875 (1.094), difficulty at 1.313 (1.534), and safety at 1.313 (1.534). With height-adjustable examination tables, the level of exertion required by a patient needing a minimal assist was reduced by 72%, the level of difficulty reduced by 64%, and a feeling of safety improved by 42%. The reported means for exertion ($t = 2.961$, $P < .05$) and difficulty ($t = 2.531$, $P < .05$) differed significantly when comparing fixed-height to adjustable height examination tables. Although, the reported mean for feeling of safety improved by 42%, the difference was not statistically significant. These reported results indicate that when a height-adjustable examination table is provided to assist a patient who requires a little bit of help to mount the table, the process of getting up on to the examination table is made much easier and requires less exertion. Figure 4 illustrates a comparison of means for the measures considered for fixed-height versus adjustable height tables when considering patient requiring a minimal assist.

The sample size of 9 for patients requiring a significant level of assistance was too small to make any good comparisons. However, the averages calculated for those patients

Table 1. Means and Standard Deviations of Measures Evaluated, Which Includes Exertion, Difficulty and Safety, for All Patient Dependency Levels.

	Exertion Fixed	Exertion Adjustable	Difficulty Fixed	Difficulty Adjustable	Safety Fixed	Safety Adjustable
Independent	0.237 (.769)	0.071 (.326)	0.241 (.711)	0.095 (.398)	0.190 (.679)	0.031 (.196)
Minimal assist	3.075 (1.970)	0.875 (1.094)	3.500 (2.11)	1.313 (1.534)	2.271 (1.713)	1.313 (1.534)
Significant assist	4.600 (3.050)	—	4.600 (3.131)	—	2.800 (1.304)	—
Wheelchair bound	5.000 (1.633)	—	5.250 (1.258)	—	4.750 (1.708)	—

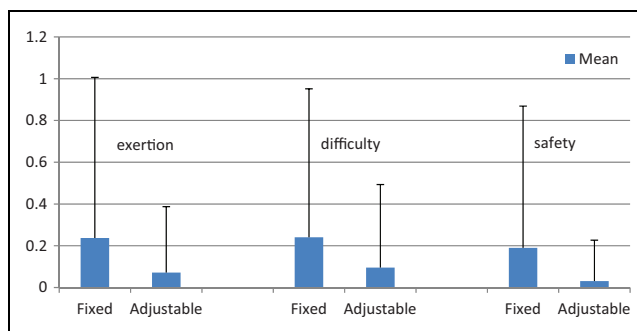
Table 2. Medians and Ranges of Measures Evaluated, Which Includes Exertion, Difficulty, and Safety, for Independent Patients.

		Exertion	Difficulty	Safety
Median	Adjustable	0	0	0
Minimum	Adjustable	0	0	0
Maximum	Adjustable	3	3	2
Median	Fixed	0	0	0
Minimum	Fixed	0	0	0
Maximum	Fixed	7	5	5

mounting a fixed-height table were exertion at 4.600 (3.050), difficulty at 4.600 (3.050), and safety at 2.800 (1.304). All 3 measure results for patients requiring a significant level of assistance are higher than the averages for the minimal assist patients. Indicating that there are problems for a patient who requires minimal assistance to try and get onto a fixed-height examination table and these problems might be greater for a patient who requires significant assistance. The limited information gained from the small sample size of patients requiring a significant level of assistance indicates that providing height-adjustable examination tables might provide an improved care experience for this population of patients.

With the wheelchair user group, 4 of the 7 patients in this category, equaling 57%, did not get up on an examination table at the appointment. The 3 wheel chair user patients who did mount examination tables reported an average level of exertion required as 5.000 (1.633), an average level of difficulty of 5.250 (1.258), and feeling of safety at 4.750 (1.708). This represents results for a fixed-height table. None of the wheelchair patients were involved with height-adjustable tables. Fixed-height examination tables appear to be a serious barrier for patients who use wheelchairs, and it seems that through the introduction of height-adjustable examination tables this barrier would be removed. Results of this study suggest that additional data collection involving patients who require significant levels of assistance and who use wheelchairs would be important to learn more about the benefits height-adjustable examination tables might provide to these populations of patients.

When considering the results for the independent patients, most patients did not indicate any problems for either the fixed-height or height-adjustable tables. Since most independent patients did not indicate any problems with the fixed-height or the height-adjustable tables, most responses were reported as 0 on the data collection tool. The distribution of responses when summarized is skewed,

**Figure 5.** Comparison of means for reported exertion, difficulty, and safety for independent patients.

and Table 2 lists the median and ranges for the responses from the independent patients.

However, the averages calculated for independent patients did show an overall higher average value for the 3 measures for the fixed-height versus the adjustable height table. For the fixed-height table, 157 patients completed data sheets, and the mean or average value for the 3 measures was exertion required (.237 [.769]), level of difficulty (.241 [.711]), and feeling of safety (.190 [.679]). For the adjustable table, 147 patients completed data forms and exertion required was (.071 [.326]), level of difficulty (.095 [.398]), and feeling of safety (.031 [.196]). Considering percent reduction, the mean calculated for exertion required was reduced by 70%, the level of difficulty reduced by 61%, and feeling of safety improved by 84%. In addition, all 3 means that were for exertion ($t = 2.421, P < .05$), difficulty ($t = 2.179, P < .05$), and feeling of safety ($t = 2.740, P < .05$) differed significantly when comparing fixed-height to height-adjustable exam tables. This demonstrates that independent patients required less exertion, found it to be less difficult, and felt safer mounting height-adjustable exam tables versus fixed-height tables. Figure 5 illustrates a comparison of means for the measures considered for fixed-height versus height-adjustable tables when considering independent patients. Since there was not sufficient data available to make statistically significant statements about those patients who required significant assistance and were wheel chair users, these results have not been illustrated, and as stated, this provides opportunities for additional research.

Discussion

Ambulatory care settings are a large and rapidly growing part of the health-care delivery system. With more pressure to

reduce health-care costs through shortened length of stay, activity in ambulatory patient care settings will only increase. It is likely that greater volumes of patients with high dependency levels, who require assistance with movement and mobility, will be seeking the services provided in ambulatory care settings. The results of this study demonstrate how through the use of height-adjustable examination tables patients use less exertion and it is less difficult to mount the examination table. These benefits of less exertion required and less difficulty are even greater for patients who have compromised mobility. Patients also felt safer when attempting to mount a height-adjustable examination table versus a fixed-height table. The footprint of a height-adjustable examination table is no different from that of a fixed-height table, and integration of this technology does not have any negative impact on spatial considerations related to the clinical environment.

Unfortunately, ambulatory clinics are still not acquiring height-adjustable exam tables. In a recent study of the 160 practices in the group investigated that required transfer of mobility-impaired patients for adequate care, 22 (9%) reported using special equipment for transfer, such as height-adjustable examination tables and mechanical lifts, to lift and transfer patients with mobility impairments in order to provide adequate care. Another 88 (55%) planned to transfer the patient from the wheelchair to a high table that was not height-adjustable without using a lift (2). As new ambulatory care clinics are built and renovations are done to existing clinics, the benefits of height-adjustable examination tables need to be recognized and those making decisions on furnishings need to understand how height-adjustable examination tables can add to the quality of care provided. Clinics should also recognize that by not providing height-adjustable exam tables, they can be considered to be noncompliant with ADA requirements and that specific standards requiring height-adjustable tables may soon be enacted.

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Patti Wawzynieki, MS, CSPHP has twenty five years of experience in employee health and safety as an Industrial Hygienist and Ergonomist. She has held positions at OSHA, aerospace manufacturers and a university health and research center. She is currently safety program manager for Hovortech International and vice president of the Association of Safe Patient Handling Professionals.