

## **Ergonomics Case Study**

### **Calibrating Patient Scales for Medical Clinic Exam Rooms**

#### **Background**

The manager of the Scientific Instruments (SI) Department at the University of Washington (UW) asked for ergonomics help in the summer of 2016. His department is responsible for calibrating patient scales at all of the satellite UW medical clinics around the state. The job is physically demanding and technicians have been injured while doing this task.

The technician has to place 100 kg (220 lbs) of official calibration weights on and off each scale to see if the scale is accurate. To spread the heavy workload, they go to clinics with 2 people. They try to take turns callibrating every other scale. It is still fatiguing to both workers. After completing a number of rooms, both technicians are sweating and panting.

Stemming from patient privacy complaints, UW made a change in how they did business. They changed from having 1 or a few centrally located scales per clinic to having a scale in every exam room. The scale calibration task became very physically demanding after this change. The injury risk also became very high. During the period between 2010 to 2016, there were 3 workers' compensation claims related to this job task. This doesn't include the unreported aches, pains, and injuries that technicians experienced.

#### **The Problem**

<p style="text-align: center;">Each unit = 10 kg (22 lbs) Ten units = 100 kg (220 lbs)</p>	<p style="text-align: center;">Transferring weights to van</p>
	

Technicians are exposed to these risk factors for sprains, strains, and over-use (SSO) injuries:

- Frequent lifting
- Awkward lifting

One roundtrip to a clinic with 35 patient scales includes:

- 70 total weight transfers on/off scale (700 lifts of unit weights) per site--*if no re-do's*
- 4 total weight transfers (40 lifts) to/from van
- Awkward lifting - all lifts in the clinics are near the floor
- Frequent lifting -20 lifts within 30-45 sec (per scale)
- Rushed activity – they can only calibrate scales in unoccupied exam rooms and they must get all weights on the scale before it times out. If the scale times out they have to remove all weights and re-do it.

Split by 2 people

**Lifting Analysis:**

Clearly, this task is unsafe.

**Lifting App Parameters:**

- 10 lifts/min
- 1 hr or less
- Hand locations at beginning of lifts (cells 13, 14, and 15)...

Distance from body: 0" 4" 16" 23"

Grid labels: 1-3 Overhead; 4-6 Top of head to 3" below shoulder; 7-9 3" below shoulder to knuckles; 10-12 Knuckles to mid-shin; 13-15 Mid-shin to floor.

**Safe lifting limit results:**

Compare lifting limits with the actual weight of 22 lbs

Cell location	< 45° twist	> 45° twist
13	6 lbs	5 lbs
14	4 lbs	3 lbs
15	2 lbs	1 lbs

What if...6-7 lifts/min and at these locations?...

Cell location	< 45° twist	> 45° twist
13	18 lbs	15 lbs
7 (most ideal location)	42 lbs	35 lbs

Lifting Calculator: <http://osha.oregon.gov/OSHAPubs/apps/liftcalc/lifting-calculator-app.html>

## Recommendations

The ergonomist offered the SI Department a wide range of ideas to reduce the injury risk for their employees, from very simple low cost ideas to ones requiring varying levels of more equipment, plus weights stored at every clinic.

Some questions were posed, such as:

- Do the scales have to be calibrated? Is it a requirement or simply their policy?
- Can they return to the centralized scale method that they used before?
- Can the technician weigh himself on a calibrated scale and then walk to every scale using himself as a quasi “calibrated” weight? (Allow no eating, drinking, adding or subtracted weight along the way to keep the weight uniform.)
- Can they “calibrate” a hand truck or a mini pallet so that either could be left on the scale during scale calibration.

Lift equipment could greatly minimize the need to manually lift weights. The equipment needs to be small and light enough to be transferred into and out of the van, be able to fit and safely roll with the load to and from the van and within the medical clinic. It still can be rather expensive and complicated to do the task with equipment— more so with some equipment choices than with others.

## Follow up and solution

There are no federal or state regulations that require this type of scale to be calibrated. However, the clinics have funding ties related to the Center for Medicare Services (CMS). Not wanting to risk any possibility of losing their funding, the SI Department does what the CMS tells them to do. In effect, the CMS requires them to follow the manufacturer’s recommendation to calibrate the scales on an annual basis.

They aren’t able to go back to having a few centralized scales, even though it was a much leaner process. There would be savings on many fronts: in time, in physical effort, and injury costs related to technicians servicing the scales.

Since there are strict rules about calibration, the simpler ideas couldn’t be used. The SI Department bought a lifting device (Lift Plus by Magliner) but had their in-house machine shop modify it so that it could fit through some narrow exam room doorways.



Department employees came up with the idea to get a single unit 100 kg calibration weight. It is safer and less precarious to roll one large, heavy weight from place to place with the lifting device instead of 10 smaller weights.

They gave the new device a nickname, the “Unicorn”. The technicians have been using the Unicorn and the large 100 kg weight since November 2016. Employees like the new system and say that it is working really well. They use 2 people to team lift and slide the device (~100 lbs) into and out of the van. Manual lifting is kept to a minimum.