

## **Adequate chest compressions on the HoverJack®: Can adequate chest compressions be done on a HoverJack® Air Patient Lift?**

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### **Introduction**

HoverTech International, Allentown, PA designed the HoverJack® Air Patient Lift as a patient transfer assistive device used in patient care settings to aide with patient transfer, specifically from the floor onto a bed. The HoverJack® has four chambers which can be individually inflated to the height needed for transfer. There is a Teflon® bottom that allows for ease of movement across all surfaces with a weight capacity of 1200 pounds.<sup>1</sup>

This study is designed to assess the adequacy and quality of chest compressions on the HoverJack® Air Patient Lift. The 2010 American Heart Association Basic Life Support guidelines emphasize the importance of early initiation of CPR with continuous attention to the quality of chest compressions.<sup>2,3</sup> Effective adult chest compressions are performed at a rate of at least 100 compressions per minute and minimum compression depth of 50 mm.<sup>2</sup> After each compression, complete recoil of the chest should be permitted.<sup>2</sup> Interruptions in compressions should be minimized in frequency and less than 10 seconds in duration.<sup>2</sup>

We hypothesize that chest compressions will be just as effective on the HoverJack® Air Patient Lift as compared to on a hard ground surface.

### **Description**

Chest compressions will be performed by a variety of healthcare professionals including technicians, paramedics, nurses, and resident physicians on a Laerdal Resusci Anne® Q CPR which measures performance of CPR. Participants will be assessed prior to performing compressions by completing a form detailing extent of CPR experience and frequency of performing chest compressions. Adequacy of compressions will be assessed by measuring inactivity time, depth, rate, recoil, and hand positioning. We will compare adequacy of chest compressions on the floor to the four different levels of inflation of the HoverJack®. Additionally, we will measure time of inactivity to stop chest compressions while transferring the simulator mannequin from the floor onto the HoverJack®, during each level of inflation, and onto the bed.

## Conclusions

We have tested the effectiveness of compressions for 19 participants. All participants have been certified or recertified in Healthcare Provider Basic Life Support within the prior two years. The mean number of years that all participants have been CPR certified was 11. 67% of participants perform CPR 1-2 times per month. Data thus far shows that compressions performed on each of the four levels of the HoverJack® are just as effective as compressions performed on the floor and found in the literature (Table 1). We anticipate that there will be no decline in compression effectiveness on the HoverJack®. Potential barriers to effective chest compressions are compressors physical height which would allow them to effectively position themselves. However, since our findings show similar compression outcomes at each HoverJack® level, healthcare professionals could inflate the chambers as needed to reach appropriate ergonomic height. Future research should study how interruptions impact CPR effectiveness during transfers from floor to HoverJack® level to bed and what strategies reduce the duration of interruptions.

Table 1: Compression results for the floor and each of the 4 levels of the HoverJack® (n=19)

		<b>Berg et al (baseline)</b>	<b>FLOOR (control)</b>	<b>HJ – 1<sup>st</sup> Chamber</b>	<b>HJ- 2<sup>nd</sup> Chamber</b>	<b>HJ – 3<sup>rd</sup> Chamber</b>	<b>HJ – 4<sup>th</sup> Chamber</b>
Mean depth of compressions (mm)	<b>Median</b>	---	51	53	53	54	55
	<b>Mean</b>	50.00	51.95	51.42	53.68	52.74	53.84
% of compressions with adequate depth	<b>Median</b>	---	81	85	97	98	99
	<b>Mean</b>	---	70.74	70.68	85.42	76.47	84.58
Mean rate (compressions/min)	<b>Median</b>	---	118	116	116	114	116
	<b>Mean</b>	100.00	115.84	115.84	115.37	113.58	113.05
% of compressions with adequate rate	<b>Median</b>	---	69	86	89	96	82
	<b>Mean</b>	---	62.32	73.89	81.79	82.89	70.53
Total # of compressions	<b>Median</b>	---	117	118	117	115	118
	<b>Mean</b>	100 – 120/min	115.79	117.05	116.58	114.05	117.84
% of compressions with adequate hand position	<b>Median</b>	---	99	100	100	100	100
	<b>Mean</b>	---	93.74	98.89	98.42	97.95	97.68
% of compressions correctly released	<b>Median</b>	---	74	92	98	93	96
	<b>Mean</b>	---	70.79	79.21	86.21	86.16	83.47

## References

1. HoverJack® Air Patient Lift. Available at: <http://www.hovermatt.com/hoverJack>. Accessed June 2, 2014.
2. Berg RA, Hemphill R, Abella BS, Aufderheide TP, Cave DM, Hazinski MF, Lerner EB, Rea TD, Sayre MR, Swor RA. Part 5: Adult Basic Life Support: 2010 American Heart Association guidelines for cardiopulmonary resuscitation and emergency cardiovascular care. *Circulation*. 2010;122:S685–S705.
3. Testing consistent with American Heart Association Guidelines 2020: An EMS Overview [www.cpr.heart.org](http://www.cpr.heart.org)