



COVID Lockdown – How Did It Impact the Muscle Strength, Body Weight and Body Mass Index of the Worker?

By Thomas B. Gilliam, Ph.D.

Summary:

Overall muscle strength decreased between 4% to 7% depending on gender and body part.

The frequency of morbid obesity (BMI ≥ 40) increased 9% for females and 20% for males.

Strength-to-Body Weight (a measure of muscle health) decreased by as much as 17% post-Covid for those in the Excellent category shifting to the Very Poor category.

Implication: The muscle health of the worker was diminished by the lockdown putting the worker at greater risk for a musculo-skeletal injury and certain lifestyle diseases.

Over the last couple of years, I have written several papers discussing the impact that COVID has had on the workforce as a result of the lockdown. The research is clear that the lockdown for most Americans resulted in less physical activity and an increase in body weight because of an increase in high sugar foods consumption.

IPCS is in a unique position to measure retrospectively the impact that the lockdown had on the physical strength, strength-to-body weight ratio, and body mass index. IPCS conducts muscular strength tests for new hire applicants for physically demanding jobs for a number of industries across the United States.

To measure this impact, the new hire strength data in the IPCS database was statistically analyzed from January 1, 2019 to November 30, 2019 (Pre-Covid) and compared to the new hire strength data collected from January 1, 2021 to November 30, 2021 (Post-Covid). Obviously, data collected in 2020 was an aberration due to COVID, and therefore not included in the analysis.

- There were 18,403 strength tests done Pre-Covid (6,221 females and 12,182 males).
- There were 17,233 strength tests done Post-Covid (5,254 females and 11,979 males).
- There was statistical significance ($p < .05$) between males and females, so the male and female data was analyzed independently.
- The same industries were involved both years representing transportation (airline, railroad, trucking), hospitals, warehouse distribution, furniture/appliance, manufacturing, utilities and public schools.

Findings

Physical Characteristics

The charts at the top of the next page shows the detail physical characteristics for the Males and Females comparing Pre-Covid to Post-Covid and the number of strength tests completed for each group. There was statistical significance ($p < .05$) for both genders for all variables except Height.

- Each gender gained about 3 pounds
- The BMI increased slightly for each gender
- Strength to body weight decreased for each gender

Males						
	Age (yrs)	Weight (pds)	Height (in)	BMI	SBW	N
Pre-Covid	34.0	207.3	70.0	29.7	3.27	12,182
Post-Covid	34.7	210.4	70.0	30.2	3.08	11,979
BMI = Body Mass Index/ SBW = Strength to Body Weight Score						
Females						
	Age (yrs)	Weight (pds)	Height (in)	BMI	SBW	N
Pre-Covid	33.9	176.9	64.3	30.1	2.40	6,221
Post-Covid	36.6	179.7	64.3	30.6	2.26	5,254
BMI = Body Mass Index / SBW = Strength to Body Weight Score						

Absolute Strength Results

The charts 1 and 2 show the changes in the absolute strength between Pre-Covid vs. Post-Covid workers for the females and males tested. There was statistical significance ($p < .05$) for the shoulders, knees and overall strength. **Strength** decreased from Pre-Covid to Post-Covid for each measure for both genders.

Chart 1

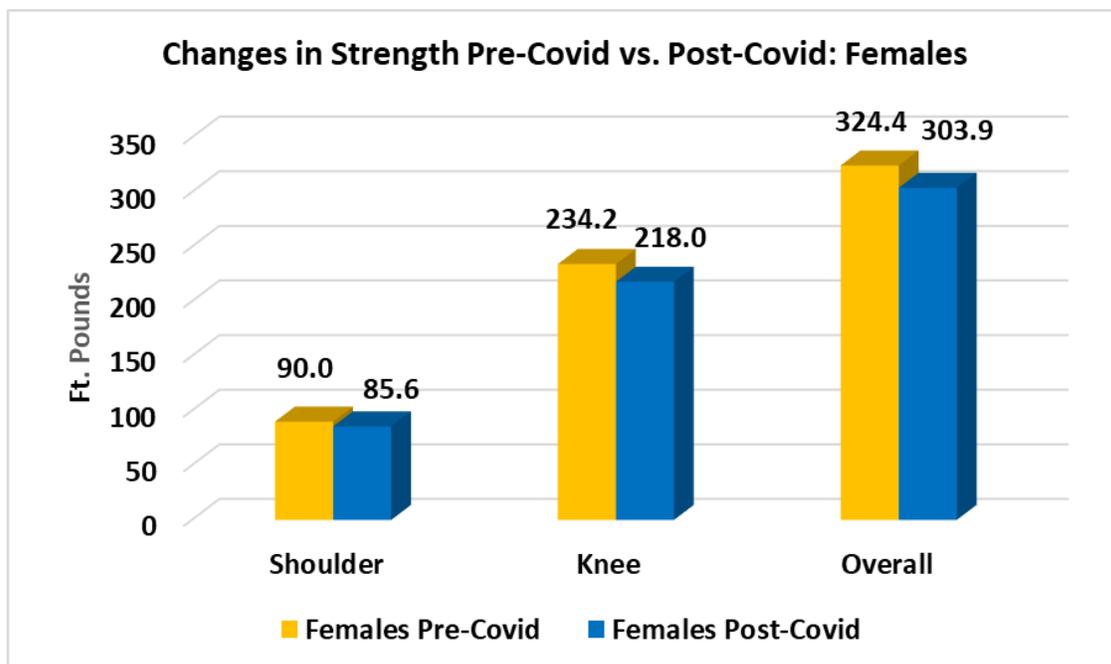
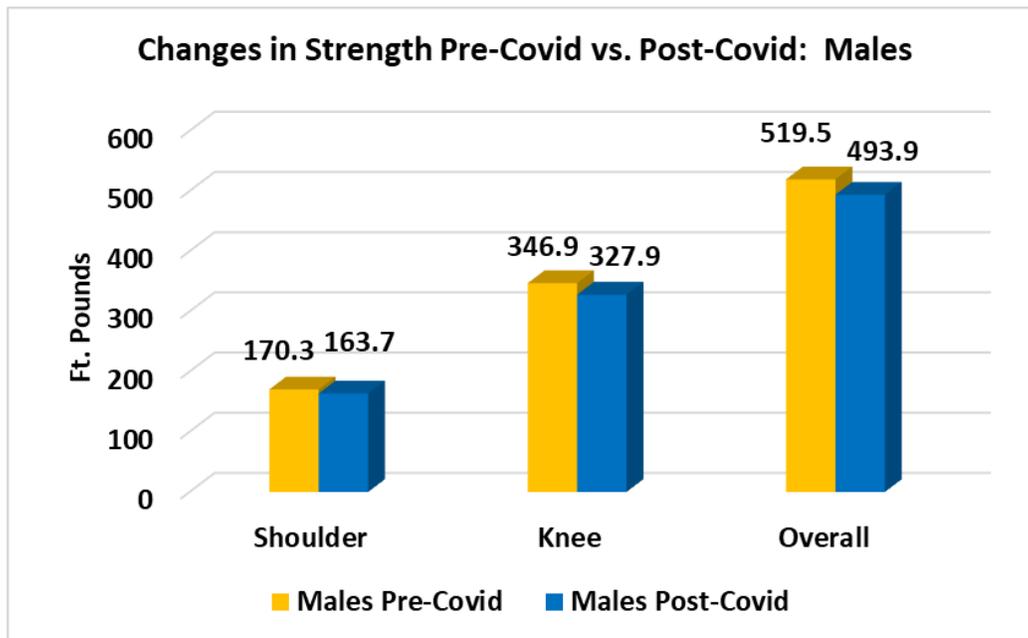


Chart 2



- Absolute strength for the shoulders and knees decreased for both males and females ranging from 4% to 7% comparing Pre-Covid to Post-Covid workers.
 - Female shoulder torque decreased by 4.9% and knee torque decreased by 6.9%.
 - Male shoulder torque decreased by 3.9% and knee torque decreased by 5.5%.

Body Mass Index (BMI) Results

Charts 3 and 4 show the changes that took place in each BMI category based on the percentage of workers of those tested who fell into the category.

- On a percentage basis, there were fewer workers in the normal and overweight BMI categories Post-Covid compared to Pre-Covid. But there was a greater percentage of workers in the all of the obese categories (starting with a BMI of 30) Post-Covid compared to Pre-Covid.
- The percentage of workers with a Body Mass Index of 40 or higher (morbid obesity) increased 8.9% for females and 19.5% for males.

- It should be noted that there was a greater percentage of females with a BMI 40 or higher category Pre-Covid compared to males (11.1% vs. 7.5%).
- It should also be pointed out that about 1.5% of the female workers and about 1% of the male workers fell into the Underweight category.

Chart 3

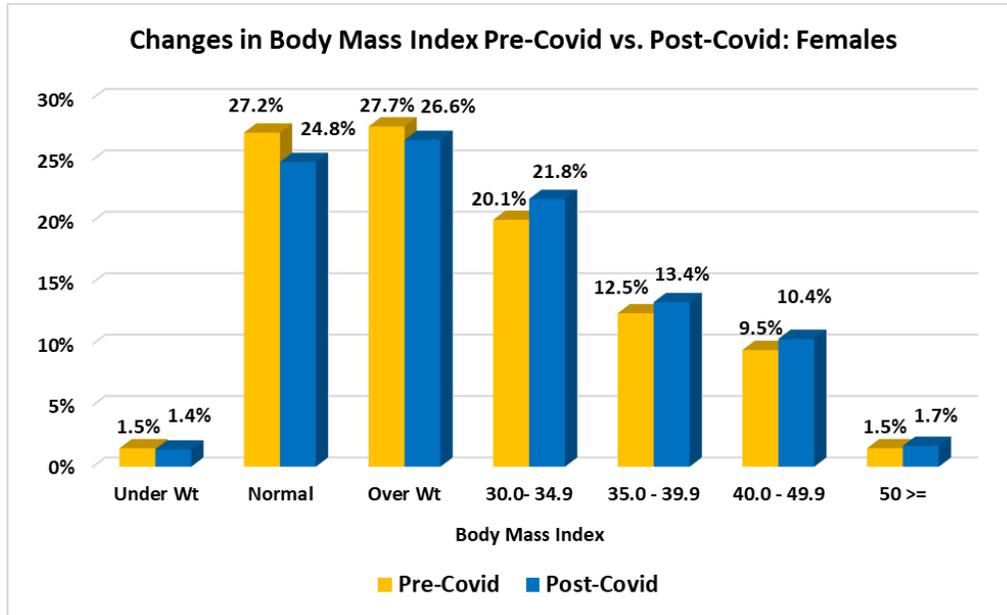
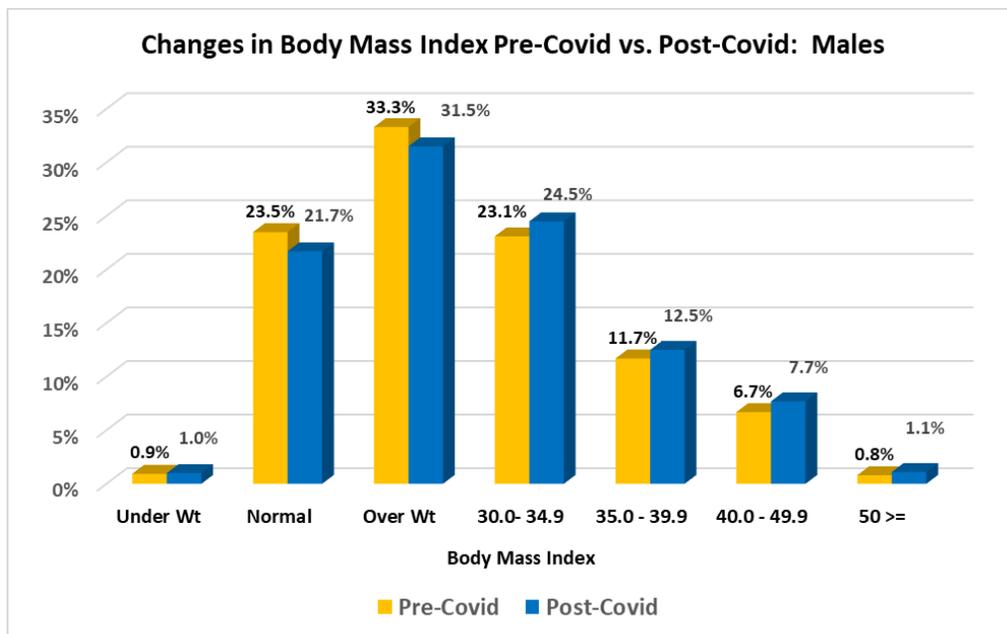


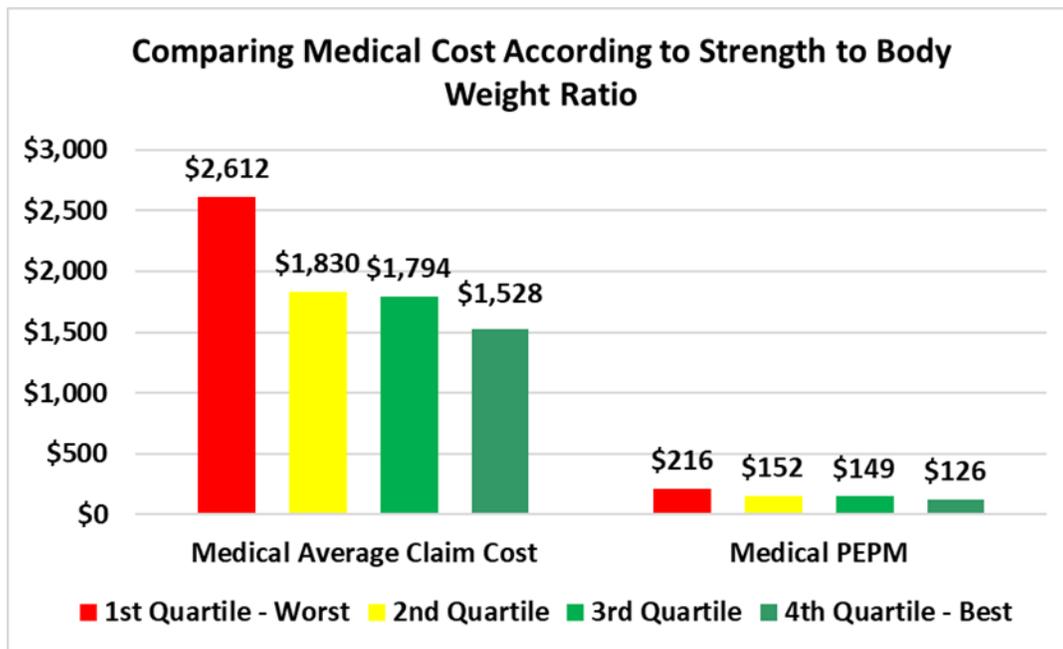
Chart 4



Strength to Body Weight – What is it?

IPCS has created a muscle health strength measure called Strength-to-Body Weight (SBW) ratio in which a score is rated from Poor to Excellent based on the frequency and cost of employee health claims. SBW is critical in terms of safety, performance and health.

Chart 5



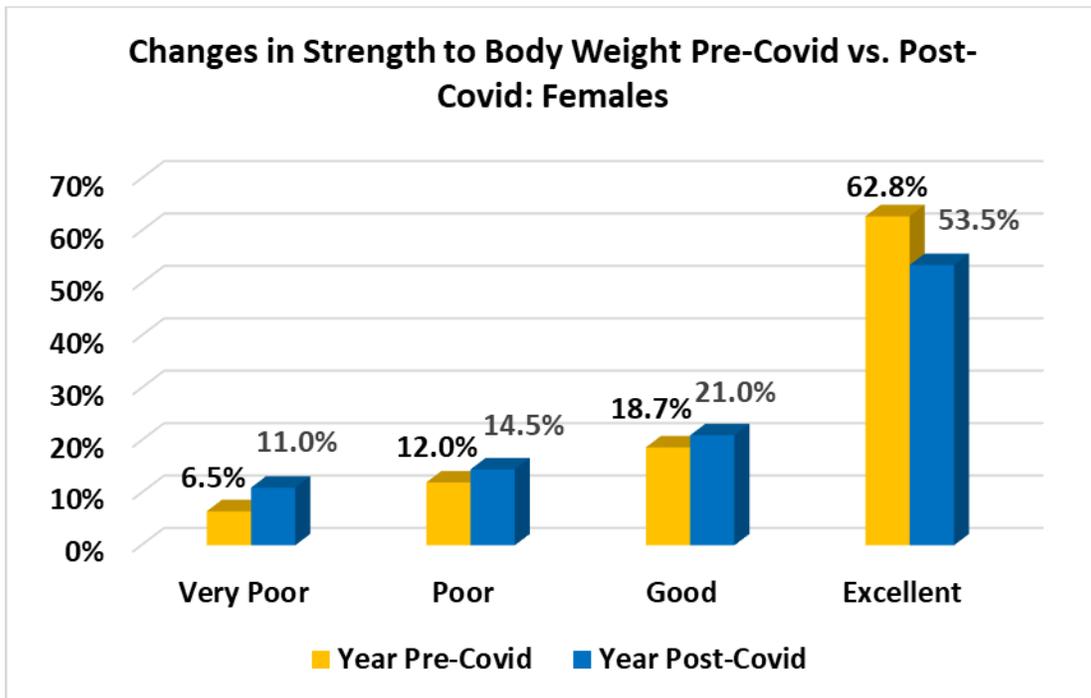
This measure was validated against 25,000 employee health data received on those who took the IPCS physical capability evaluation (PCE). This measure could be useful to industry to measure changes in the overall muscle health of its workforce. The **effectiveness** of the SBW on employee's health costs can be shown in Chart 5. The worker who falls in the Excellent category (Green) has an average health cost 42% less compared to the worker in the Poor category (Red).

SBW Pre-Covid vs. Post-Covid Results

- A Very Poor SBW (strength is disproportionately lower compared to body weight) has high risk for injury and certain lifestyle diseases and an Excellent SBW has low risk (strength is, at least, proportionate to body weight).
- Bottom line, the workers overall SBW shifted from the Excellent Pre-Covid category to the Poor category Post-Covid.

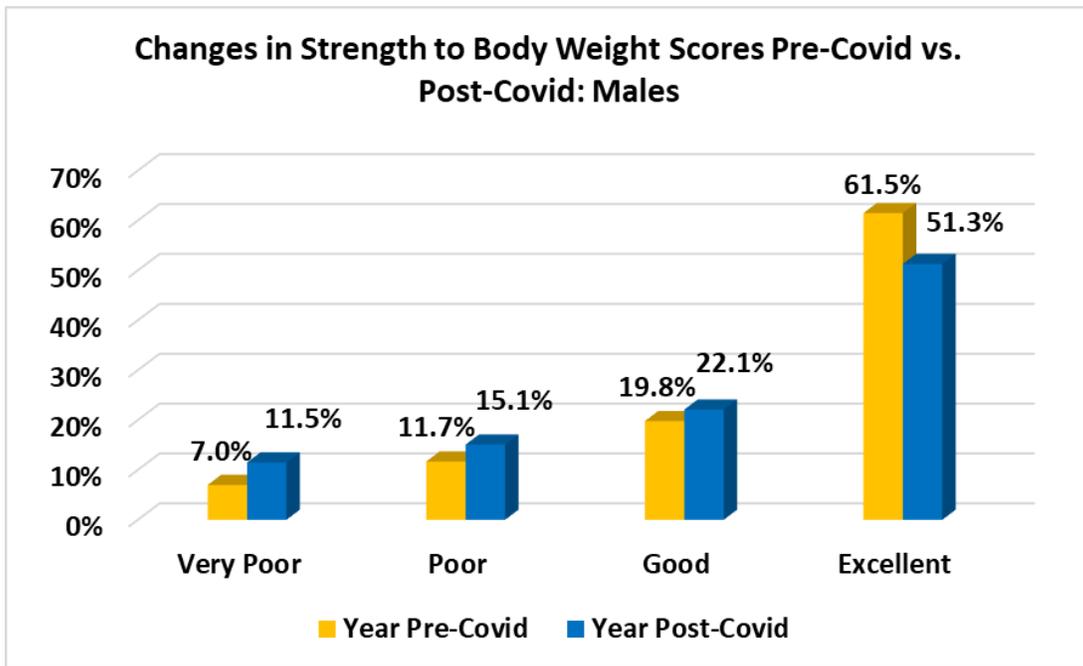
- Chart 6 shows the percentage of female workers with an Excellent SBW decreased from 62.8% in Pre-Covid to 53.5% Post-Covid whereas those workers in the Very Poor category increased from 6.5% to 11.0%. Post-Covid also showed a 2.5% increase in the percentage for the Poor category. The increase Post-Covid shown for the Good category is a result of some of the workers moving from the Excellent category to the Good category.

Chart 6



- Chart 7 shows the percentage of male workers with an Excellent SBW decreased from 61.5% in Year 1 to 51.3% in Post-Covid whereas those workers in the Very Poor category increased from 7.0% to 11.5%. Post-Covid also showed a 3.4% increase in the percentage for the Poor category. The increase Post-Covid shown for the Good category is a result of some of the workers moving from the Excellent category to the Good category.

Chart 7



Where Do You Go From Here?

We have learned a great deal in how now to prevent viruses like Covid and to help better manage viruses as more will undoubtedly occur. Physical activity and nutrition are critical. We know physical activity and muscular strength training have numerous benefits toward safety and performance. But it also has a critical role in maintaining the body's immune system. Covid has brought the immune system into the limelight because Covid, like most viruses, greatly weakens the immune system which puts the worker at greater risk for a variety of illnesses and diseases. The Covid research shows that those individuals with a healthier immune system had fewer hospitalizations, ICU admittance and death.

Promoting physical activity and muscular strength training among your workforce contributes greatly to the overall health of the worker and enhances any safety program in terms of reducing musculo-skeletal injuries.

Many researchers now believe that the pandemic is in the endemic stage as indicated by weaker mutations of the Covid variant. This is a good time to plan

health and safety programs for the worker that will better prepare the worker and their families to better deal with future viruses through physical activity and muscular strength exercises.

IPCS can work with you to establish a comprehensive muscular health screening program linked to personal trainers to enhance the health of the workforce. The IPCS SBW program is designed to monitor progress in terms of improving muscular strength and/or body weight.

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