

## How safe is it to lift weights when you are over 70?

At the Centre for STRONG Medicine we have been using weight lifting exercise to build muscle and treat disease for over 10 years now. In this time, we have collected the largest body of information on the long-term effects of weight training on older people. This data has includes outcomes such as: strength, muscle mass, walking ability and speed, balance, mood, quality of life, fear of falling; and adverse events or injuries sustained in the process of exercising.

We have trained over 1400 people and have completed 105,259 hours of supervised training and at least 15,086 testing sessions. Our patients (aged 21 – 100 years, with a mean age of 74 years) have had various (on average 4) medical conditions and syndromes (including Arthritis, Osteoporosis, Depression, Frailty, Diabetes, Chronic Lung Disease, Stroke, Cardiac Disease, Parkinson's Disease). In this time, we have had very few major events or injuries, which can be associated with exercise. That is, there have been no Heart Attacks or Strokes.

Despite the accepted medical screening recommendations for older people focusing on heart problems, our data suggests, the focus of screening should be on musculoskeletal problems. We can now safely and confidently say this as the most frequent exercise related complaints are in the shoulder, followed by lower back and the knee. We have found that with our Medical Screening (history, examination and an ECG) it is very safe to start weight lifting.

With our extensive data, we have been able to look at the risk of injuries in people with certain diseases / syndromes. For example:

### 1. Cardiovascular System events

We have been no heart attacks or strokes in exercise training or testing sessions over 11 years. There were 19 cardiovascular events, 10 of which were angina, most of which occurred during the 6-minute walk test. This is one episode of angina every 10,529 hrs exercise training. There were 6 episodes of syncope (2 patients), 2 episodes of hypotension and 1 leaking aortic aneurysm (in a patient with a known repair).

### 2. Diabetes

We have trained over 239 people with Diabetes. In this time we have had 20 hypoglycemic events. This tells us that you need to train 1,963 hours with diabetic patients before experiencing one hypoglycemic event.

### 3. Osteoporosis

There is a great fear associated with weight training when you have osteoporosis or thin bones. We have trained 451 patients with osteoporosis and have recorded a total of 5 fractures. All 5 of these fractures have been in the lumbar spine. We have looked at the circumstances under which these fractures occurred and found:

- 2 were sustained during balance training
- 1 was following a fall getting off a machine!
- Only 2 of the fractures were weight training related.

We can therefore say that balance training, which we supervise 1-1, seems to be just as dangerous as weight training in terms of sustaining a fracture. Our figures show that you need to conduct 10,085 hours of training before one fracture in an Osteoporotic population.

### 4. Falls

We have had 42 **in session** falls (by 39 people). The majority of these falls have been getting on/off or moving between machines in an often busy, environment. Considering our patient population with a high prevalence of frailty and gait and balance problems and use of walking aides, this falls rate is quite low suggesting that we have 1 fall every 24,506 hours of training.

The tables below summarize all the Adverse Events we have recorded (and the hours of exercise training that need to be conducted before each event is likely to occur).

(No. of events)		Incidence in testing per person (n= 1,329)	Incidence in training per person n = 1,329 )	Testing Hours to event encountered n = 15,086 sessions	Total hours till event encountered n = 105,259 sessions
Cardiovascular events (19)		4 0.3%	15 1.1%	3,772	5,540
Fractures (5)		0 0.0%	5 0.4%	0	26,315
Falls (42)		3 0.2%	39 2.9%	5,029	2,506
Lacerations (18)		1 0.1%	17 1.3%	15,086	5,848
Hypos (20)		1 0.1%	19 1.4%	15,086	5,263
Hernia (14)	New	0 0.0%	7 0.5%	N/A	15,037
	Worsening	0 0.0%	7 0.5%	N/A	15,037
Prolapse (6)	New	0 0.0%	4 0.3%	N/A	26,315
	Worsening	0 0.0%	2 0.2%	N/A	52,630

Incidence of Musculoskeletal Injury in 1329 patients 105,259 training / testing sessions ( 1999-2011)				
	No. incidents discussed	No. Pt's making reports	No. Adverse Events	Hrs to injury
<b>Shoulder</b>	262	133	86	1,224
<b>Back</b>	237	189	65	1,619
<b>Knee</b>	175	139	40	2,631
<b>Hip / Groin</b>	78	66	52	2,024
<b>Wrist / Thumb</b>	68	60	42	2,506
<b>Buttock</b>	40	36	21	5,012
<b>Elbow</b>	18	17	13	8,097
<b>Gout</b>	5	5	5	21,052

If you have any questions regarding the program or adverse events, please direct your inquiry to a member of our team.

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