The Centre for STRONG Medicine Results

Data has been collected for over 15 years (we have been collecting data since 2000) to support the following results.

In this time, over 2000 people have been treated using the STRONG model, accounting for 133,966 exercise training hours and over 19,000 exercise testing sessions.

n = 1332	Mean	Range
Age (yrs)	73.3	(19 – 96)
Medication	5.4	(0 – 18)
Weight (kg's)	77	(55 – 146)
BMI	27.9	(14.5 – 67.7)
No. Indications	4	(1 – 21)

Demographic Data (n = 1332)	
Female	63%
Married	46%
Independent Living	95%
Nursing home / Hostel	2%

The mean age of participants is 73.3 years. They are on average 77Kg, have 4 exercise indications and take 5 medications. 63% of the population was female, 46% were married and 95% were living independently.

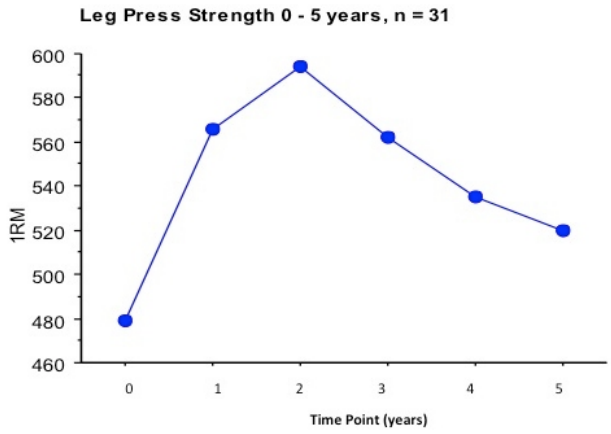
We have been successfully administering exercise as a treatment for many years with minimal side effects or risks.

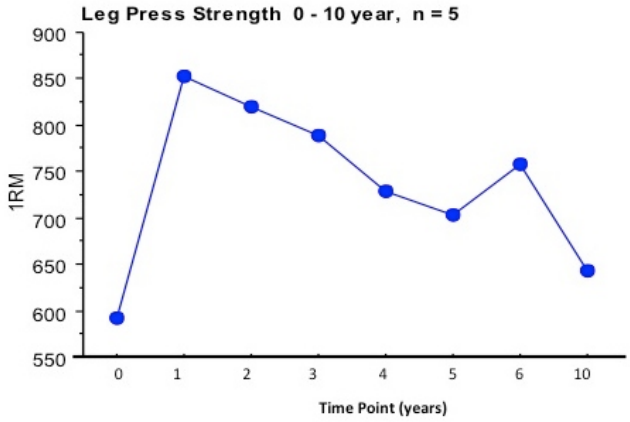
Whilst a large amount of data is now available both in the literature and our clinical practice reflecting the effectiveness of well designed and effectively administered weight lifting exercise program, it is rarely used in disease treatment. The graphs below are a small number of objective (Strength and Performance based tests) and subjective measures (self administered questionnaires reflecting a variety of aspects of daily life) factors, which can be positively affected with exercise.

Strength Results

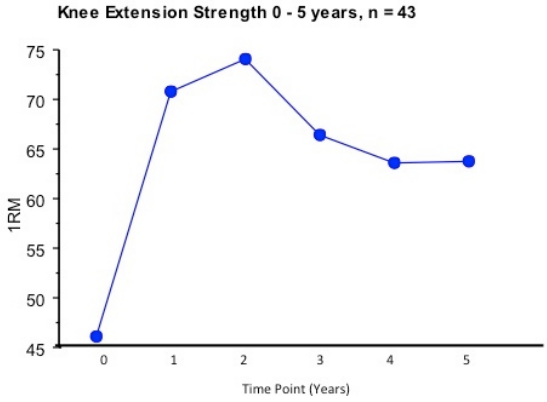
Strength is, measured using the One Repetition Maximum (1RM) test. The 1RM test is widely used in the exercise literature and is the heaviest weight, which can be lifted through the full range of motion (ROM) with good form, one time. Each person has their 1RM measured on each prescribed machine at baseline and periodically to ensure they are being trained at the optimal intensity and to measure progress.

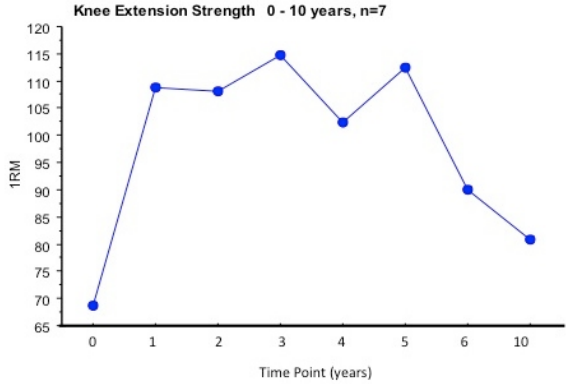
1. **Leg Press:** Utilises the gluteals, quadriceps and hamstrings



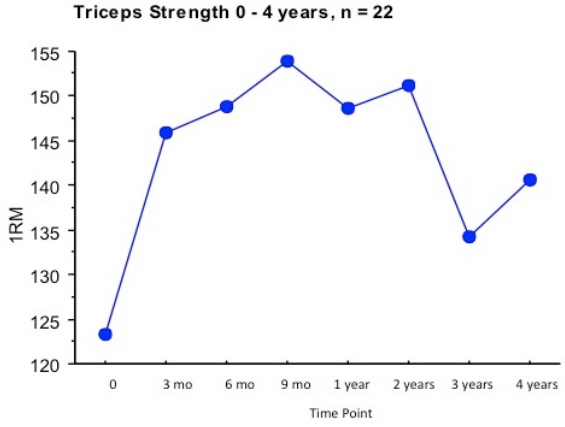


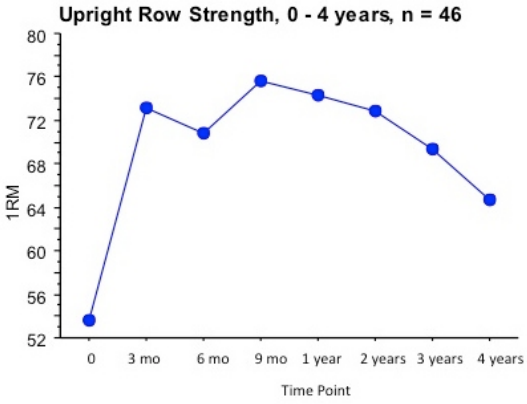
2. **Knee extension:** Utilises Quadriceps





3. Upper Limbs: Triceps (utilises triceps) **and Upright Row** (utilises muscles of the upper back, and arms)



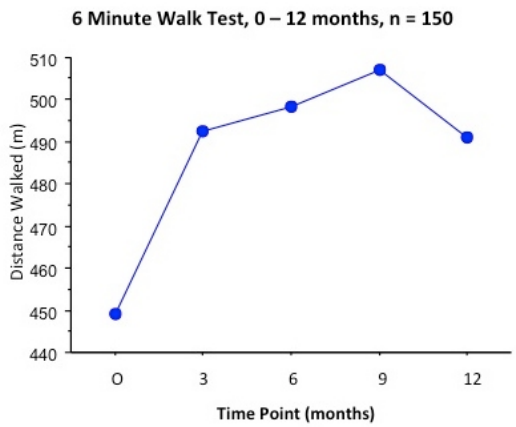


The strength graphs above reflect the results for the same group of people over a 5 and 10-year period. The first graph (0-5 years) shows a significant increase in 1RM from baseline to 2 years with small declines over the subsequent period. What is of great significance in these graphs is that, despite advancing age and small declines in strength from 2 years onwards, even to 10 years strength remains significantly greater than at baseline. This is even more powerful when we consider that after the age of 40 we lose 10% of strength each decade.

Physical Function

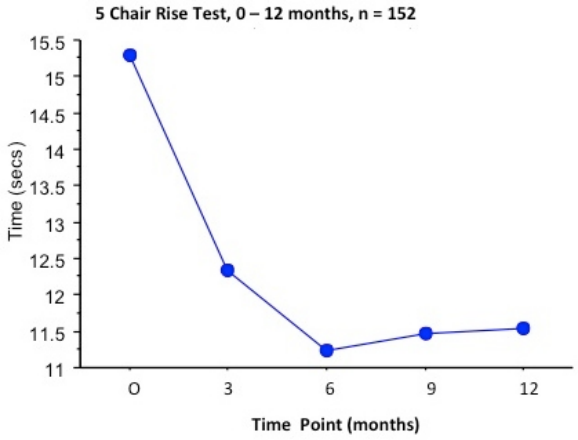
Physical Function is measured using a series of performance based tests which are widely used in the literature including: the 6 minute walk test, 5chair rise test, habitual and maximal walking speed, 1 leg stand test and tandem walk test.

1. 6 Minute Walk test



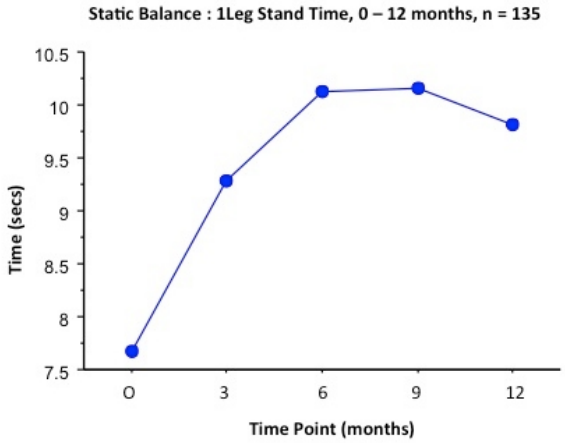
The 6-minute walk measures the maximal distance that can be walked over a defined course in a period of 6 minutes. On average at the commencement of exercise, patients were able to walk 450m, by 9 months this same group of people could walk 510m. These results were achieved without a specific cardiovascular / walking exercise regime.

2. 5 Chair rise



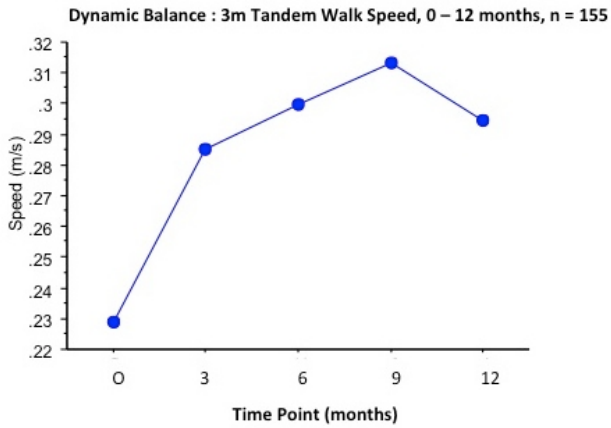
The 5 Chair Rise test measures the time taken to rise to standing 5 times as fast as possible without the use of arms. This is a particularly difficult activity for many and subsequently disabling. The graph above shows a reduction in the time taken to complete this test, reflecting improvements in lower body strength, balance and confidence.

3. Static Balance



The static balance test is the 1 leg stand. The person is required to stand on 1 leg unsupported and this is timed. The test is ended once balance is lost or once 15 seconds is achieved. The results show an improvement in the mean length of time that this position could be held from 7.5 seconds to 10secs.

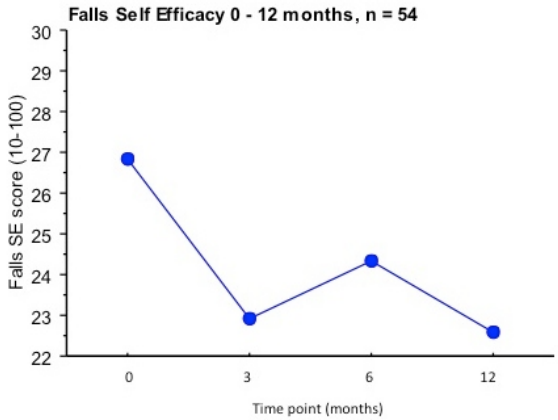
4. Dynamic Balance



Dynamic Balance is measured using the 3m Tandem walk test, that is the time taken to walk heel to toe in a straight line over a 3m distance. Both the time and the errors are measured. Once again improvements in speed are demonstrated over a 12-month period.

Self Rating of Function

Falls

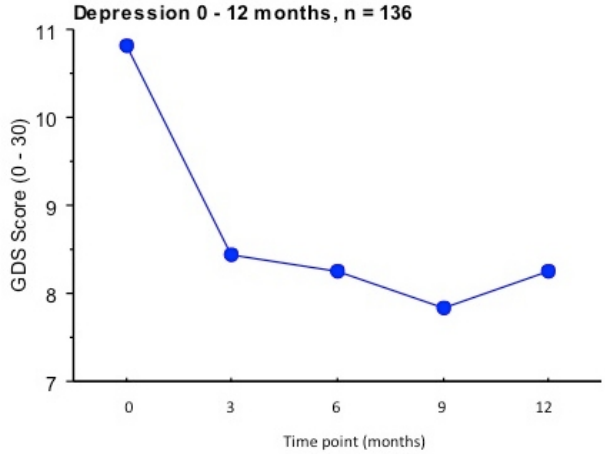


Falls Efficacy is measured using the Tinnetti Falls Self Efficacy questionnaire.

The total score is 100 and a higher score indicates a lesser degree of confidence that one can complete daily activities without falling.

Over a 12-month period, we have demonstrated a reduction in falls SE score suggesting an increase in certainty that a fall will not occur.

Depression



The Geriatric Depression Scale is commonly used to screen for Depressed mood in older adults. This rating scale is scored from 0-30 with a higher score indicating depressed mood.

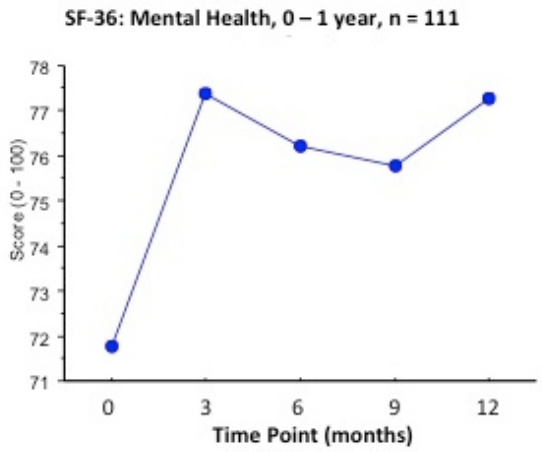
Scores > 23 suggest severe Depression.

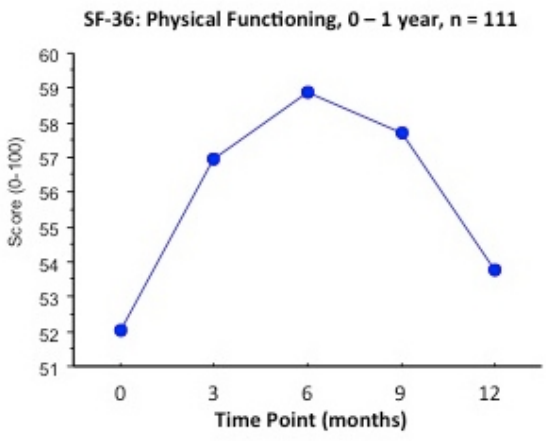
Over a 12-month period, in 136 patients the mean GDS score dropped and this drop was essentially sustained to 3 years.

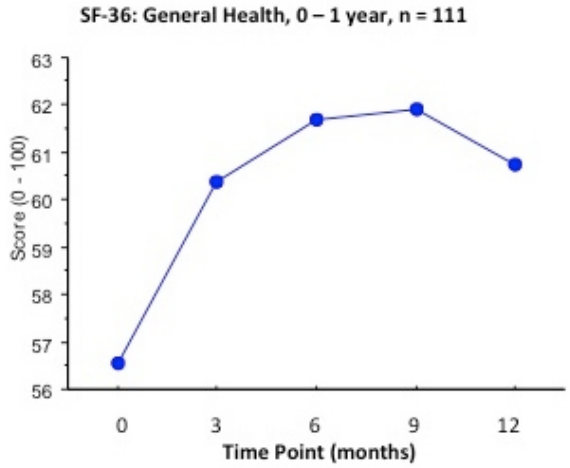
Quality of Life

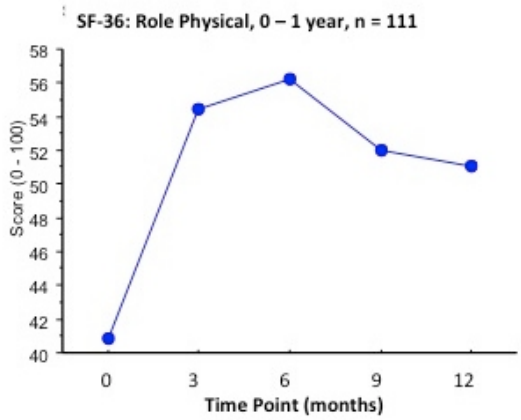
Quality of life is measured using the SF-36. This questionnaire measures 8 domains: Mental Health, Physical Functioning, General Health, Vitality, Social Functioning, Role Physical, Role Emotional and Bodily Pain. Scores range for each category from 0-100 with higher scores indicating better perceptions of quality of life.

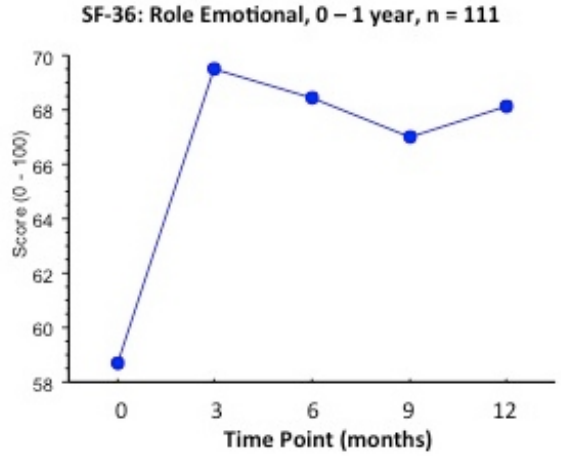
Whilst there are anticipated variations in each measure over time the results suggest that with exercise, quality of life is improved and sustained over time in all areas.

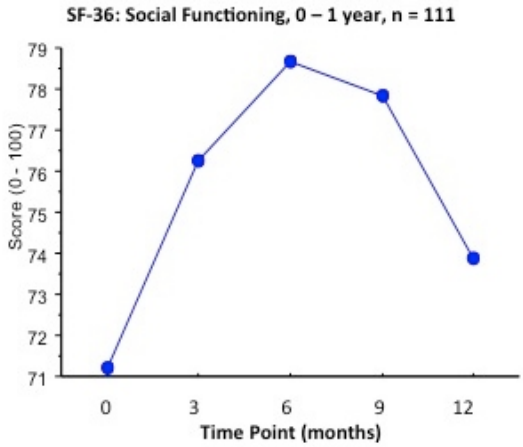


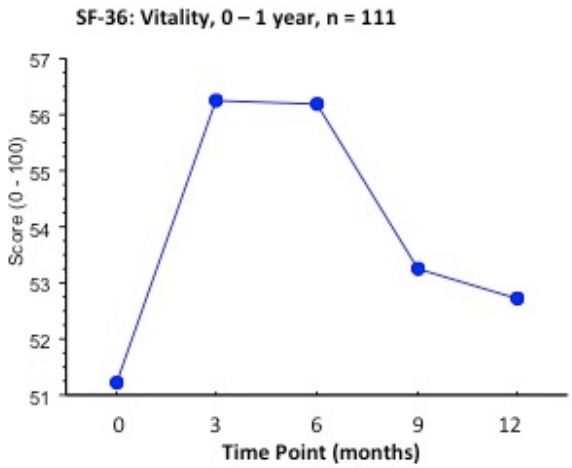


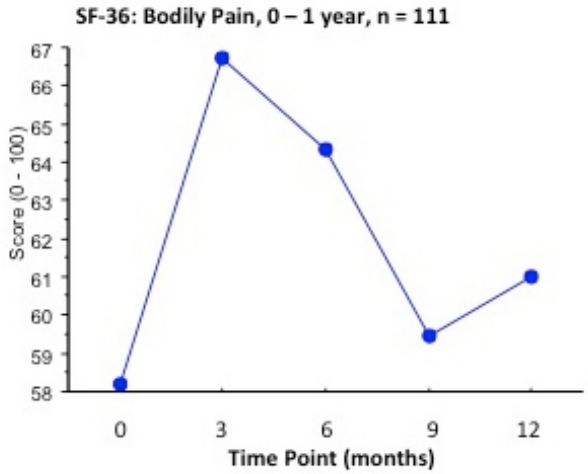

SF-36: General Health, 0 – 1 year, n = 111
Score (0 - 100)
63
62
61
60
59
58
57
56
0
3
6
9
12
Time Point (months)


SF-36: Role Physical, 0 – 1 year, n = 111
Score (0 - 100)
58
56
54
52
50
48
46
44
42
40
0
3
6
9
12
Time Point (months)


SF-36: Role Emotional, 0 – 1 year, n = 111
Score (0 - 100)
70
68
66
64
62
60
58
0
3
6
9
12
Time Point (months)


SF-36: Social Functioning, 0 – 1 year, n = 111
Score (0 - 100)
79
78
77
76
75
74
73
72
71
0
3
6
9
12
Time Point (months)

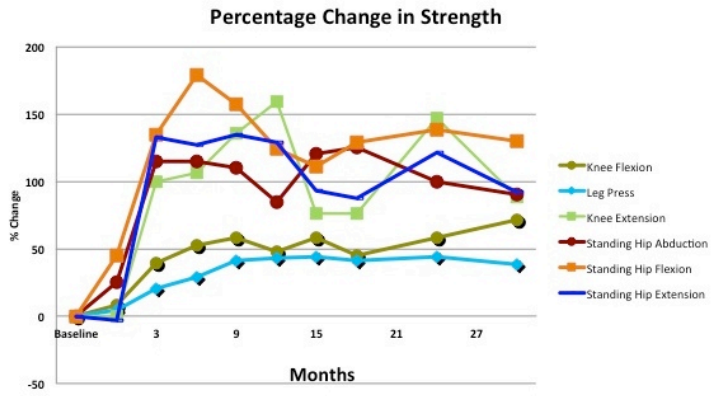

SF-36: Vitality, 0 – 1 year, n = 111
Score (0 - 100)
57
56
55
54
53
52
51
0
3
6
9
12
Time Point (months)


SF-36: Bodily Pain, 0 – 1 year, n = 111
Score (0 - 100)
67
66
65
64
63
62
61
60
59
58
0
3
6
9
12
Time Point (months)

Case Studies

Case Study 1. Mrs Mc G

Name: Mrs Mc G Age: 87 Compliance (%): 88
Training Indications: Osteoporosis, Osteoarthritis (TKR), Hypothyroidism

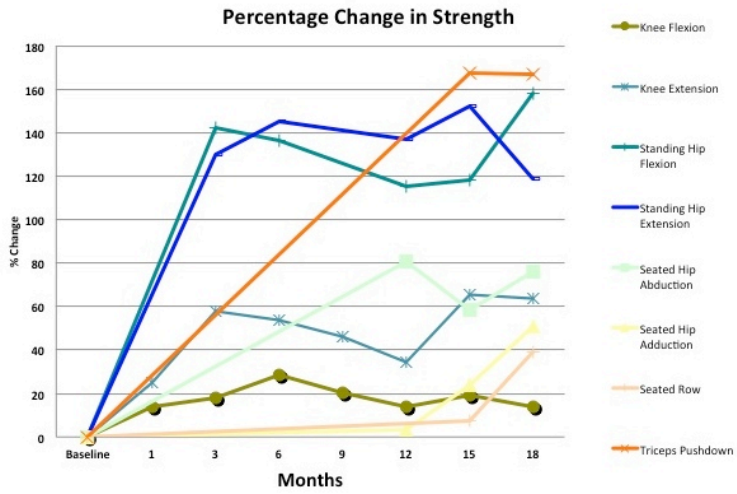


Mrs McG is an 87-year-old lady training specifically for Osteoporosis and Osteoarthritis. She was also the carer for her elderly husband who was suffering with dementia.

- Mrs Mc G initially commenced exercise training twice a week and has displayed excellent compliance at 88%
- In her first 12 months she achieved excellent gains in her strength (ranging from 45% - 170%).
- After 12 months she reduced her frequency of exercise training to 1 day per week.
- This graph indicates the maintenance of these strength gains out to 27 month of exercise training.

Case Study 2: Mr W

Name: Mr W Age: 68 Compliance (%): 100
Training Indications: Inclusion Body Myocitis (IBM), Obesity, IHD, falls

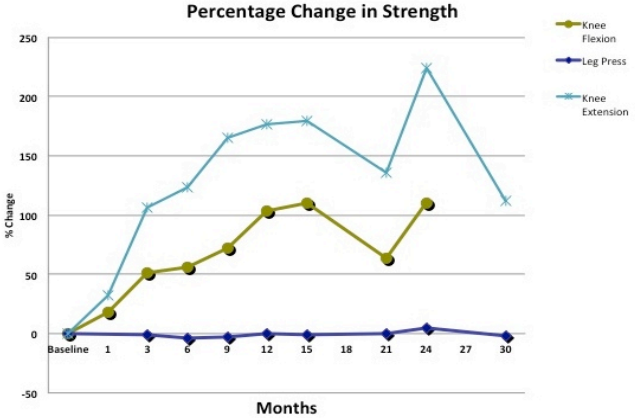


Mr W is a 68-year-old man with Inclusion Body Myocitis and subsequent severe proximal weakness, falls, obesity and IHD. He was prescribed a thrice-weekly program and showed excellent compliance at 100%.

- Mr W was able to achieve excellent improvements in his strength such that he recognised a significant improvement ion his physical function.
- To 18 months strength remains at least 10% above the baseline measures despite the progressive nature of his disease.

Case Study 3 Mr HR

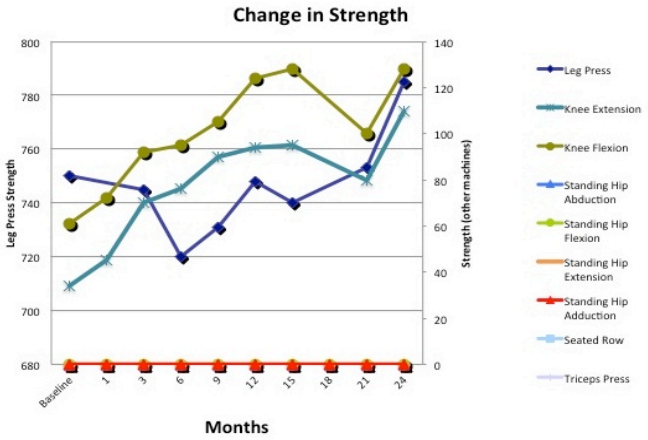
Name: Mr H R (slide 1) Age: 27 Compliance (%): 93
Training Indications: TBI (age 9), Obesity, OP, Gait and Balance impairment, falls



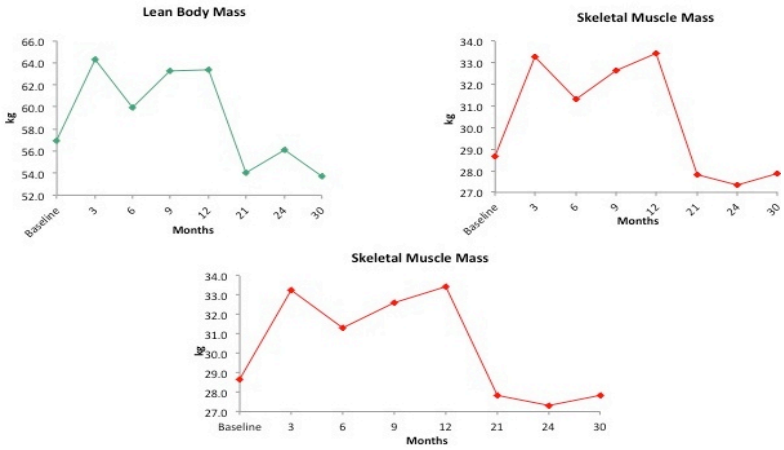
Mr H R is a 27-year-old man, who has been cared for by his parents since he sustained severe TBI as a small child. In addition to severe physical and cognitive impairments, on presentation he was abdominally obese, suffered osteoporosis (with a recent vertebral fracture) and falls. With his increasing size and his parents advancing age they were significantly concerned about his health and their ability to provide ongoing care.

The slides show actual strength measures and precent changes in strength in addition to weight / waist measures and body composition.

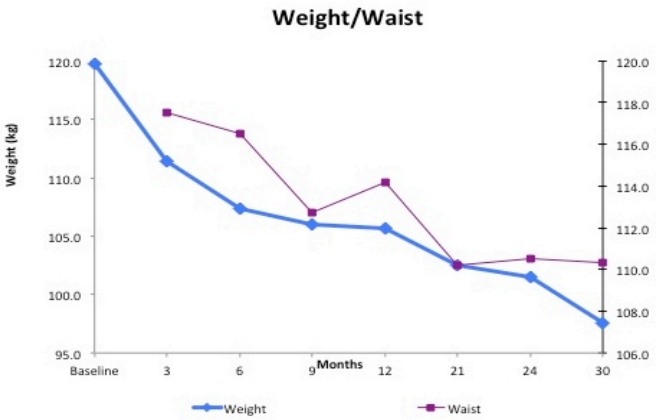
Name: Mr H R (slide s) Age: 27 Compliance (%): 93
Training Indications: TBI (age 9), Obesity, OP, Gait and Balance impairment, falls



Name: Mr H R (slide 3) Age: 27 Compliance (%): 93
Training Indications: TBI (age 9), Obesity, OP, Gait and Balance impairment, falls



Name: Mr H R (slide 3) Age: 27 Compliance (%): 93
Training Indications: TBI (age 9), Obesity, OP, Gait and Balance impairment, falls



This patient achieved a significant benefit from a generalised high intensity weight lifting exercise program. In addition to marked improvements in strength, he had a significant drop in waist and weight measures, and improvements in body composition.

There was a marked functional benefits with improvements in ability to transfer from sit – stand, walk short distances and reduction in back pain.