



the **BA**
festival
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Healthy eating: healthy exercise



**‘Healthy Diet v Dietary
Supplementation:
Improving Physical Fitness and
Quality of Life in Older People’**

Dr Gladys Pearson



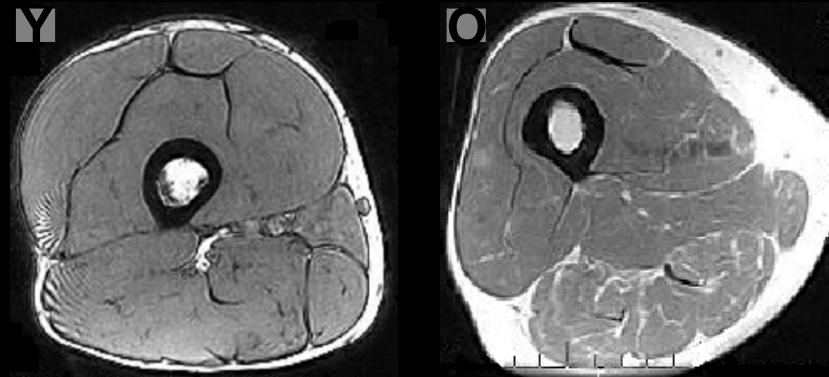
Background

- Ageing associated Loss of independence occurs through various circumstances
- Increased dependence is linked to loss of mobility (Doherty, 2003)
- Decreased mobility is caused principally by sarcopenia
- The deleterious biological changes which have traditionally been attributed to ageing are in fact caused by
 - malnutrition (Blumberg, 1994; Vellas et al., 1997)
 - decreased physical activity

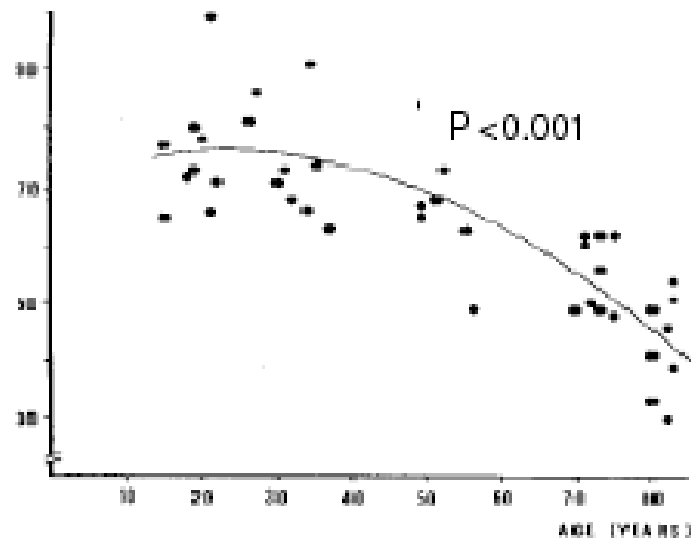




Sarcopenia



A Muscle area (mm^2)



B Total number of fibres ($\times 10^3$)

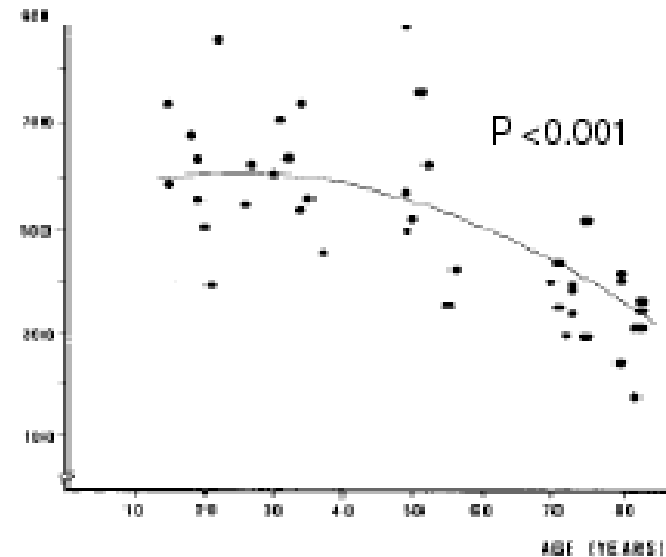
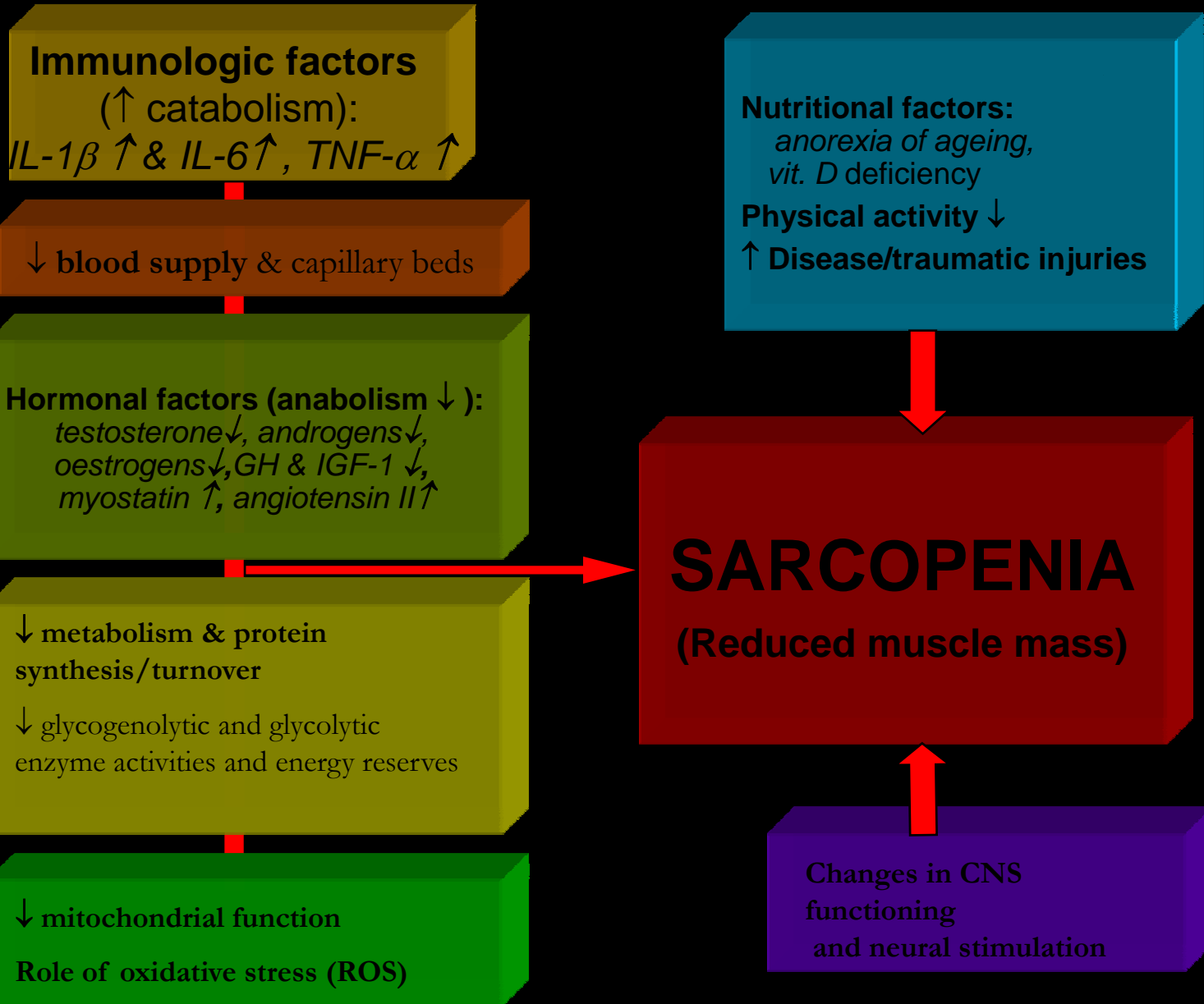


Figure 1.1 Skeletal muscle architecture in older adults. The relationship between A) skeletal muscle CSA and B) the total number of skeletal muscle fibres. Reproduced with permission (Lexell et al., 1988)



Origins of sarcopenia





Why proteins?

- The RDA of protein (0.8g kg/day) may in fact, be insufficient to meet the dietary needs of older adults
- Protein accounts for 30% of whole-body protein turnover
- Protein turnover declines by ~20% by 70-years (W. W. Campbell et al., 2001)
- As a consequence of a lack of dietary protein a loss in physiological function can occur, with the body seeking to re-establish a steady metabolic state

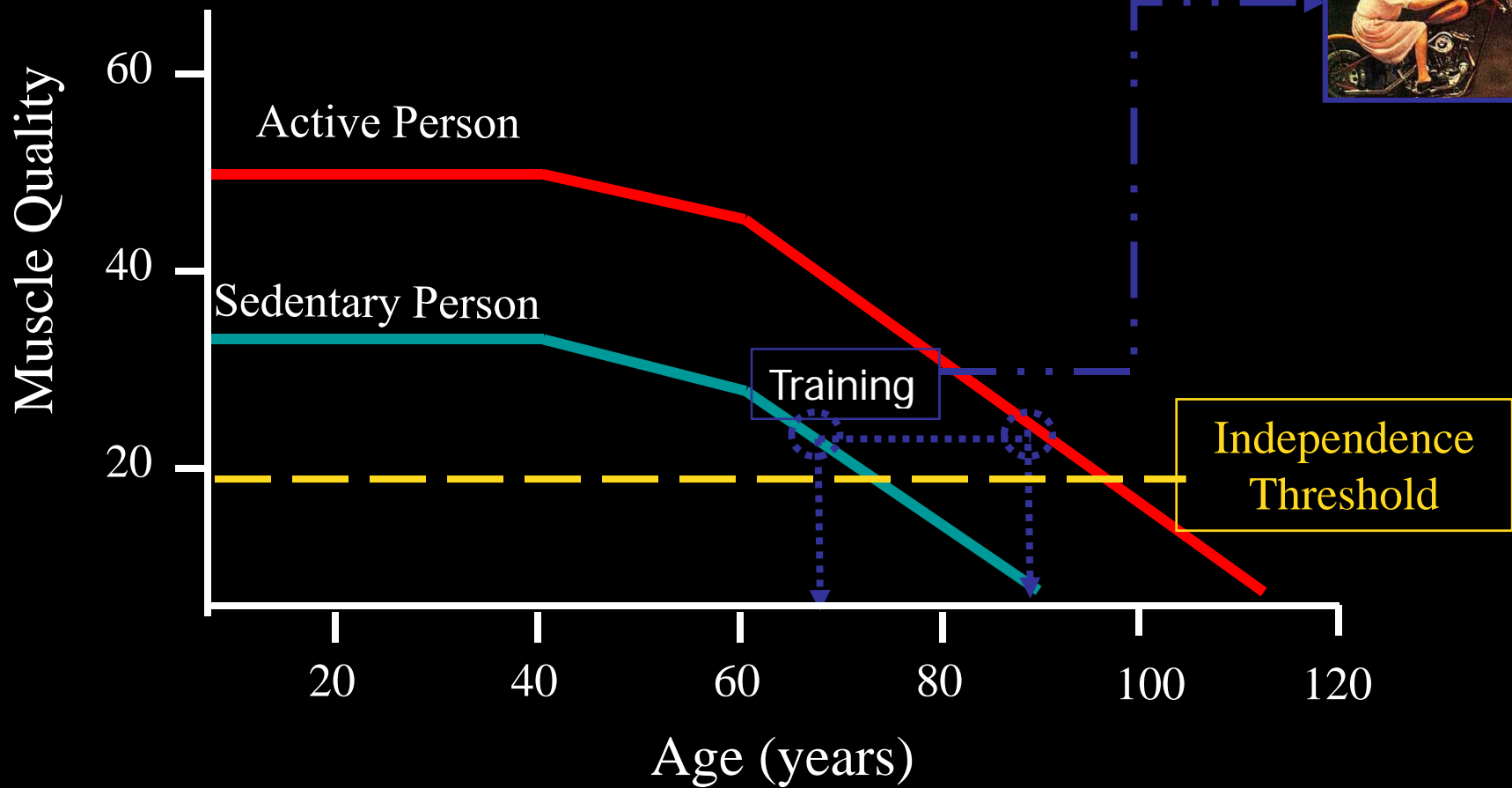


Why resistance exercise?

- The decline in levels of physical activity with ageing are, in part, responsible for the decreased energy requirements (Vaughan et al., 1991)
- Neither endurance nor aerobic exercises show the significant functional benefits seen with resistance exercise
- The effects of resistance training on energy intake, expenditure and body composition are largely unstudied and remain inconclusive



Obligatory Muscle Quality ↓ with Age





Barriers

- The cost of nutrient dense foods
- Intolerance to certain food groups
- Difficulty tearing or chewing fibrous foods
- Fear of consuming too much fat or cholesterol (Chernoff, 2004)
- The cost of gym memberships
- Adequacy of facilities
- Access to facilities
- Motivation (direct social environment)



SPARC Study



Group	Gender	N	Age (yrs)	Activity (mins p/wk)	Height (m)	Weight (kg)
CON	Male	10	76.1 ± 2.4	245.5 ± 214.2	1.7 ± 0.05	79.1 ± 9.4
	Female	8	76.5 ± 4.4	395.7 ± 457	1.58 ± 0.05	68.3 ± 11.7
SUP	Male	9	71 ± 3.7	360 ± 167.4	1.77 ± 0.08	82.2 ± 11.5
	Female	9	72.6 ± 5.9	319.6 ± 202.4	1.61 ± 0.07	70.8 ± 14.9
TRAIN	Male	4	68 ± 7	273.3 ± 175	1.72 ± 0.03	81.7 ± 8.9
	Female	6	66 ± 4.5	313.3 ± 183	1.6 ± 0.04	70.6 ± 13.2
SUPTRAIN	Male	7	68.9 ± 5.2	277.5 ± 89.3	1.8 ± 0.07	85.6 ± 13.9
	Female	6	67.2 ± 5	227.5 ± 145	1.58 ± 0.08	65.7 ± 13.1

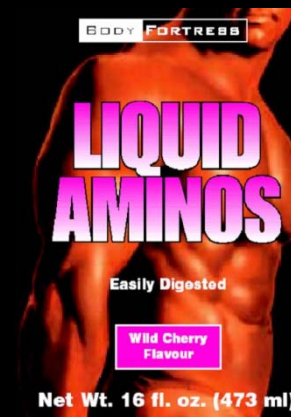
Participants

- Kept a food diary
- Were prescribed physical exercise
- Some received Nutritional Advice
- Some received nutritional supplementation

Immediately prior to, and during exercise



&



15-30mins After exercise



RESULTS- STRENGTH

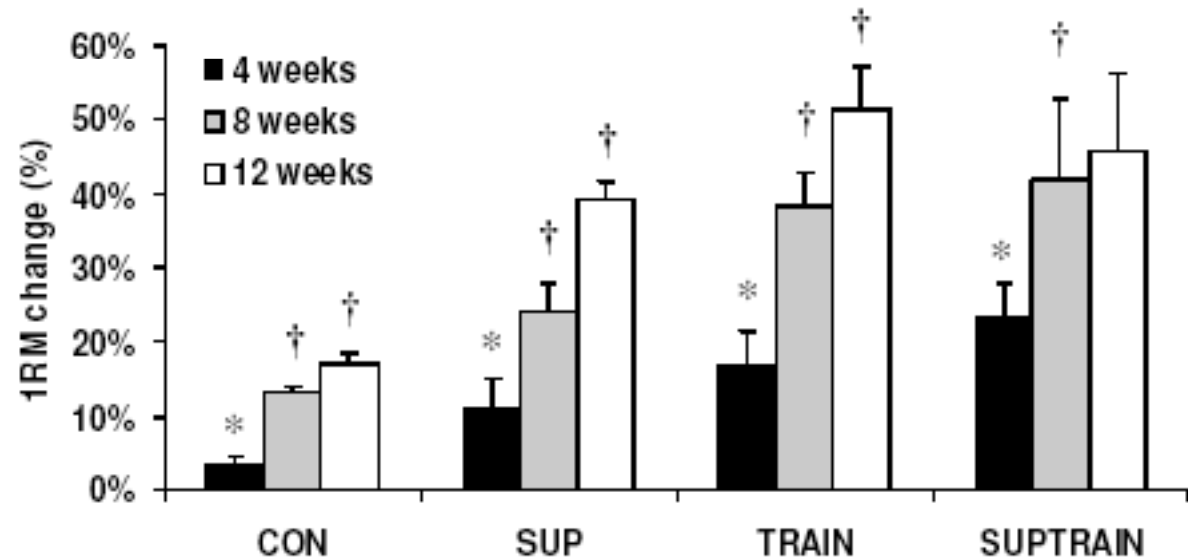
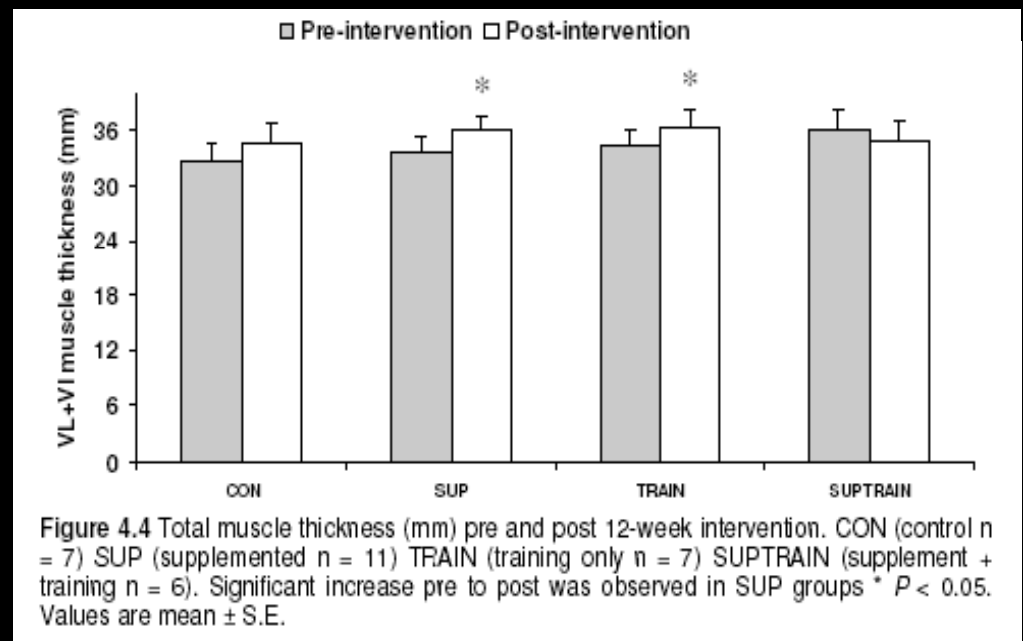
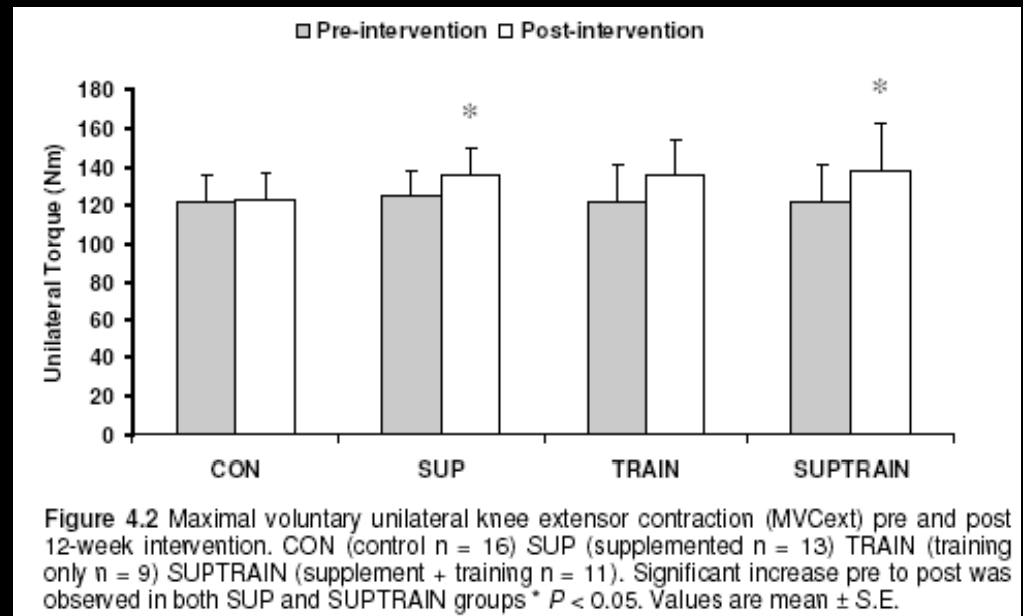
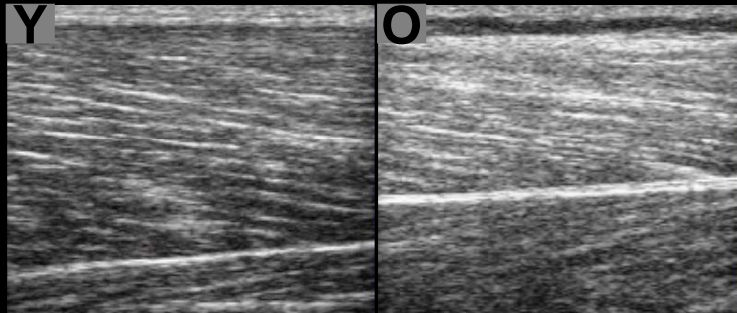


Figure 4.1 Average increases in 1RM strength for all lower limb exercises. (control n = 18) SUP (supplemented n = 18) TRAIN (training only n = 10) SUPTRAIN (supplement + training n = 13). Significant increase in 1RM over the 12-week intervention was observed in CON, SUP, TRAIN and SUPTRAIN groups. * indicates significant increase vs. baseline, † indicates significant increase vs. all prior time-points ($P < 0.05$). Values are Mean \pm S.E.



RESULTS- Contractile characteristics





RESULTS - FUNCTIONAL ABILITIES



Participant undergoing the GET-UP-AND-GO test (Figure 3.4) and Participant undergoing the 6-MINUTE WALK TEST (Figure 3.5)

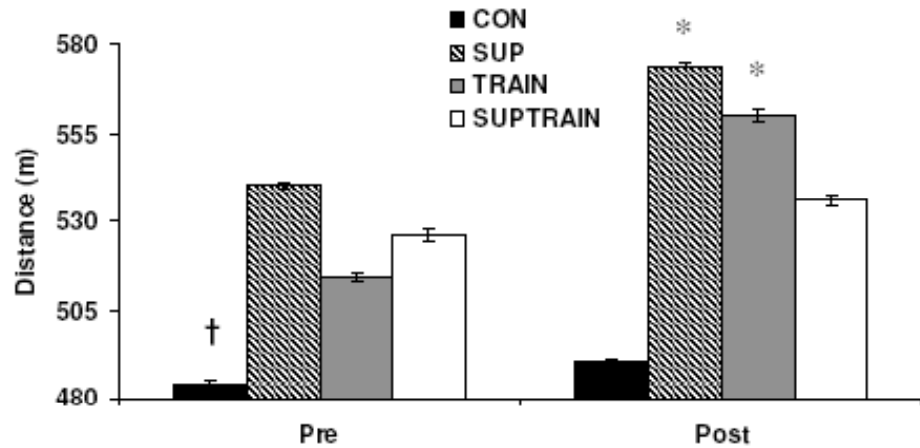


Figure 4.5 6-min walk distance (m) pre and post 12-week intervention. CON (control = 17) SUP (supplemented n = 15) TRAIN (training only n = 9) SUPTRAIN (supplement + training n = 12). † indicates significantly lower than all other groups. * Significantly more distance over 6-min ($P < 0.05$). Values are mean \pm S.E.

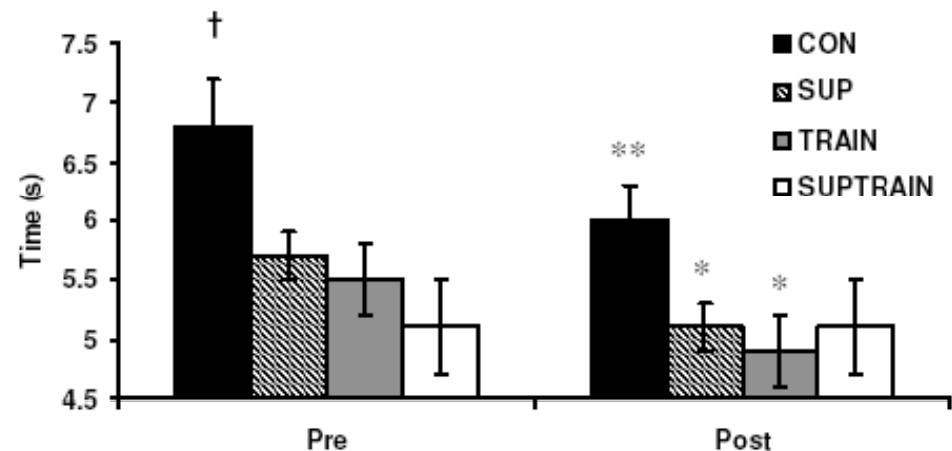


Figure 4.6 Get-up-and-go (GUG) time pre and post 12-week intervention. CON (control n = 17) SUP (supplemented n = 15) TRAIN (training only n = 8) SUPTRAIN (supplement + training n = 10). † indicates significantly more time taken compared to all other groups. Significant decrease in time (s) pre to post was observed in CON, SUP and TRAIN groups ** = $P < 0.01$, * = $P < 0.05$. Values are mean \pm S.E.



Results- Metabolic Profiles

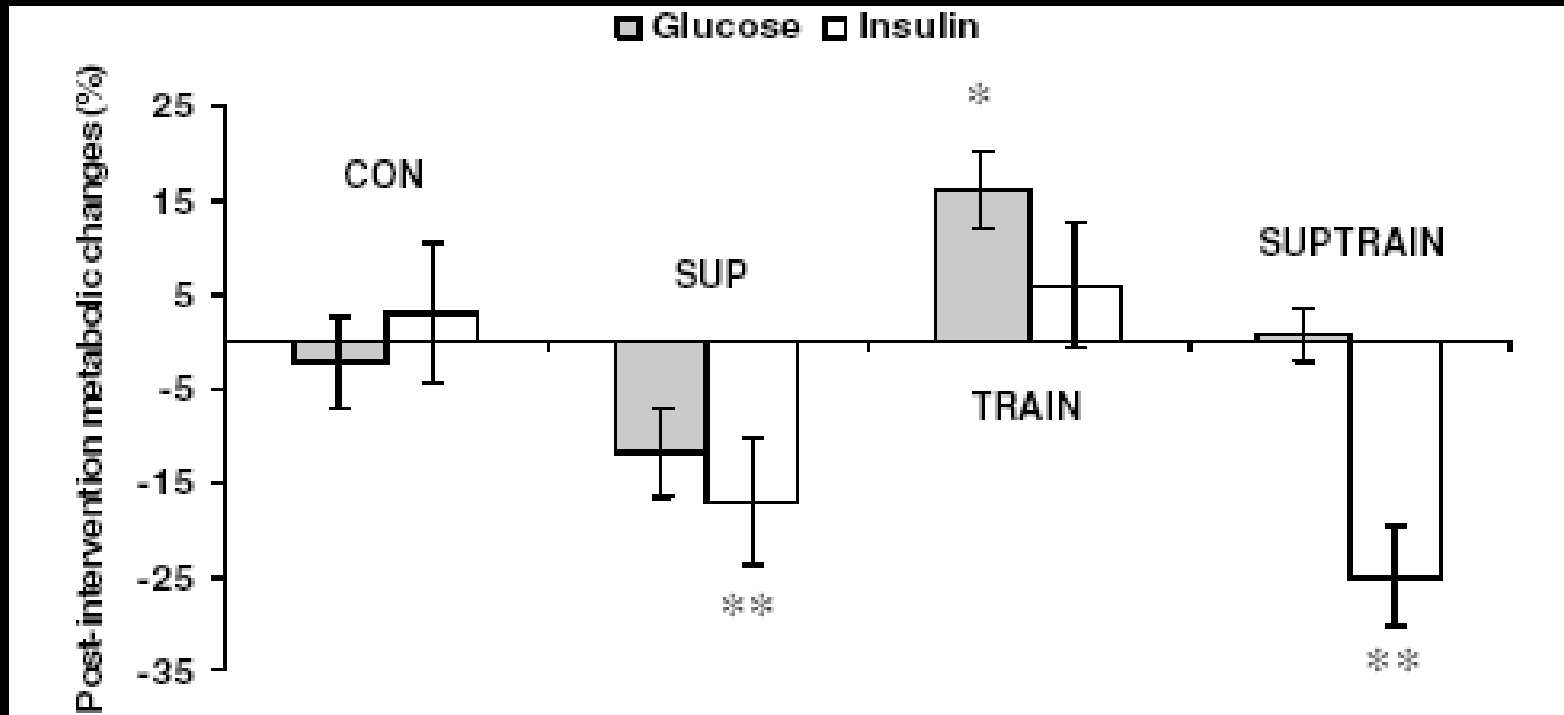


Figure 4.7 Plasma glucose and insulin changes post 12-week intervention. CON (control n = 17) SUP (supplemented n = 15) TRAIN (training only n = 10) SUPTRAIN (supplement + training n = 9). * Significant increase from pre to post-intervention ($P < 0.05$); observed in SUP. ** Significant decrease from pre to post intervention ($P < 0.05$); observed in TRAIN group. Values are mean \pm S.E.



Key Findings

- Resistance exercise does not necessarily have to be very intensive to give significant benefits in older individuals



- Low-intensity resistance exercise combined with supplementation (Protein and carbohydrate supplements) may be a sufficiently effective way of improving
 - Muscle characteristics and performance (I.e. physiology)
 - General health profiles (I.e. endocrine profile and habitual function)



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