

## **Vitamin D levels and maximal handgrip force in adults with Neurofibromatosis type (NF1)**

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**Background** – Low mean serum concentrations of 25-hydroxyvitamin D (25(OH)D) have been described in NF1 individuals compared with unaffected controls [Lammert et al, 2006]. Vitamin D is involved in the generation of muscle strength [Pfeifer et al, 2002] and NF1 individuals were found to have reduced maximal handgrip force ( $F_{max}$ ) [Souza et al, 2009] as well as overall reduced strength [Johnson et al, 2010] compared to healthy controls [Souza et al, 2009]. Hockett et al observed reduced muscle function in NF1 children with no relationship with 25(OH)D, also not different from NF1 unaffected siblings. However, to our knowledge, no attempt has been made to correlate serum levels of 25(OH)D and  $F_{max}$  in adults with NF1.

**Aim** - To assess 25(OH)D serum levels and  $F_{max}$  in adults with NF1 compared with unaffected controls matched by sex, age and physical activity levels.

**Methods** – The first 22 eligible NF1 volunteers (11 male, 11 female) and 22 healthy controls (11 male, 11 female) were evaluated for  $F_{max}$  using a handgrip dynamometer. Forearm circumference (cm) was measured with a tape and its cross sectional area was derived to express the force per unit of forearm area ( $N/cm^2$ ). Three measurements were performed and the mean  $F_{max}$  of both hands used. Serum concentrations of 25(OH)D, calcium ( $Ca$  and  $Ca^+$ ), inorganic phosphate ( $PO_4$ ) and parathyroid hormone (PTH) were measured. Data was presented as mean and standard deviation and compared using Student t test (parametric variables) and as median and interquartile range, compared with Mann-Whitney test (non-parametric variables). Spearman's correlation coefficient was used. Probability values  $< 0.05$  were considered statistically significant.

**Results** -  $F_{max}$  was reduced in NF1 individuals ( $6.7 \pm 1.5 N/cm^2$ ) compared to unaffected controls ( $7.8 \pm 1.7 N/cm^2$ ) ( $P=0.025$ ). There was no significant differences in 25(OH),  $Ca$ ,  $Ca^+$ ,  $PO_4$  and PTH between NF1 subjects (23.8 (11.5), 10.3 (0.8), 5 (0.3),  $49.4 \pm 15.8$ ,  $3.5 \pm 0.6$ ) and unaffected controls (22.6 (6), 10.2 (0.6), 5.1 (0.2),  $46.8 \pm 15$ ,  $3.8 \pm 0.5$ ) ( $P=0.927$ , 0.669, 0.416, 0.621, 0.126). No correlation was observed between 25(OH)D levels and  $F_{max}$  ( $r=0.138$ ) ( $P=0.416$ ).

**Conclusion** – Individuals with NF1 presented reduced  $F_{max}$  but no significant relationship was observed with 25(OH)D serum levels.

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