Impaired muscle function has been coupled to vitamin D insufficiency in young women and in elderly men and women. Those living at Northern latitudes are at risk of vitamin D insufficiency due to low sun exposure which may be more pronounced among elite swimmers because of their indoor training schedules. We aimed to examine vitamin D status among young elite swimmers and evaluate the association between vitamin D status and muscle strength. Twenty-nine swimmers, 12 female and 17 male (16-24 years) residing at latitude 55-56°N were studied in March and April. Blood samples were analysed for serum 25-hydroxyvitamin D (s-25(OH)D) and hand-grip strength was measured as marker of muscle strength. Subjects' vitamin D and calcium intake were assessed by food frequency questionnaire and sun exposure and training status by questionnaires. Mean (±SD) s-25(OH)D was 52.6 ± 18.3 nmol/L among all swimmers. In 45% of the swimmers s-25(OH)D was below 50 nmol/L. Female swimmers had higher s-25(OH)D concentration than male swimmers (61.7 ± 17.5 nmol/L vs. 46.2 ± 16.5 nmol/L, p = 0.026). Among male swimmers, those with sufficient vitamin D status had higher hand grip strength than those with insufficient vitamin D status (50.6 ± 6.4 kg vs. 41.1 ± 7.8 kg, p = 0.02). Among Danish elite swimmers 45% had an insufficient vitamin D status during the spring; the prevalence being higher among male swimmers. Muscle strength was significantly higher in male swimmers with sufficient vitamin D status.