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## Does Vitamin D Affect Neuromuscular Function in Older Adults?

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# DOES VITAMIN D AFFECT NEUROMUSCULAR FUNCTION IN OLDER ADULTS?

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<https://www.hippocraticpost.com/muscular-skeleton-not-vitamin-d-supplements-created-equal/>



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- OF THE APPROXIMATELY 1 BILLION PEOPLE WITH VITAMIN D DEFICIENCY, IT IS ESPECIALLY PREVALENT AMONG THE ELDERLY POPULATION (SAHOTA, 2014)
- WHEN A PERSON 20-30 YEARS OLD AND A PERSON OLDER THAN 65 SPEND THE SAME AMOUNT OF TIME IN SUNLIGHT, THE OLDER ADULT WILL ONLY ABSORB APPROXIMATELY A QUARTER OF THE VITAMIN D THAT THE YOUNG ADULT WILL ABSORB (HILL & ASPRAY, 2017)
- "NEUROMUSCULAR CONTROL INVOLVES THE SUBCONSCIOUS INTEGRATION OF SENSORY INFORMATION THAT IS PROCESSED BY THE CENTRAL NERVOUS SYSTEM, RESULTING IN CONTROLLED MOVEMENT THROUGH COORDINATED MUSCLE ACTIVITY" (HURD & SNYDER-MACKLER, 2017, p 247)
- SOME OF THE RISK FACTORS THAT CONTRIBUTE TO THE INCIDENCE OF FALLS IN OLDER ADULTS INCLUDE HAZARDOUS ENVIRONMENTS IN THE HOME, USE OF CERTAIN MEDICATIONS, SENSORY IMPAIRMENTS, HISTORY OF FALLS, USE OF ASSISTIVE DEVICES SUCH AS A WALKER OR A CANE, AND BALANCE OR GAIT IMPAIRMENTS (SHARIF, AL-HARBI, AL-SHIHABI, AL-DAOUR, & SHARIF, 2018)
- IN THE PAST YEAR, THE WORLD HAD AN ESTIMATED 29 MILLION OLDER ADULT FALLS. THIS ACCOUNTS FOR 28.7% OF THE OLDER ADULT POPULATION (CDC, 2017)
- "THE OLDER ADULT POPULATION IS EXPECTED TO INCREASE 55% BY 2030. APPLYING THE NUMBER OF FALLS FROM [THE 2014] ANALYSIS TO THE PROJECTED 2030 POPULATION WOULD RESULT IN AN ESTIMATED 48.8 MILLION FALLS AND 11.9 MILLION FALL INJURIES, UNLESS EFFECTIVE INTERVENTIONS ARE IMPLEMENTED NATIONWIDE" (BERGEN, ET AL., 2016, P. 996-998)

## QUESTION

IN ADULTS OLDER THAN 65 WITH VITAMIN D DEFICIENCY, WHAT IS THE EFFECT OF VITAMIN D SUPPLEMENTATION VERSUS NO VITAMIN D SUPPLEMENTATION ON NEUROMUSCULAR FUNCTION?

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- THE RESULTS OF THE RESEARCH WERE INCONCLUSIVE BECAUSE OF THE INCONSISTENCIES IN GUIDELINES FOR VITAMIN D DEFICIENCY AND SUPPLEMENTATION REGIMENS.
- MORE RESEARCH IS NEEDED TO UNDERSTAND THE EFFECTS OF VITAMIN D SUPPLEMENTATION ON FUNCTIONAL PARAMETERS IN OLDER ADULTS AS WELL AS THE EFFECTS ON NEUROMUSCULAR FUNCTION TO PREVENT FALLS.

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- IMPLEMENTING CLINICAL PRACTICE GUIDELINES FOR VITAMIN D SCREENINGS IN OLDER ADULTS AND SUPPLEMENTING TO ACHIEVE SUFFICIENT VITAMIN D LEVELS
- IMPLEMENTING CLINICAL STANDARDS FOR BLOOD LEVELS THAT ARE CONSIDERED VITAMIN D DEFICIENT
- BECAUSE MORE RESEARCH IS NECESSARY, NURSE RESEARCHERS COULD EVALUATE THE EFFECT OF VITAMIN D SUPPLEMENTATION ON NEUROMUSCULAR FUNCTION IN DEFICIENT OLDER ADULTS BASED ON CLINICAL PRACTICE GUIDELINES



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STUDY	SUMMARY	FINDINGS
"EFFECTS OF VITAMIN D SUPPLEMENTATION ON NEUROPLASTICITY IN OLDER ADULTS: A DOUBLE-BLIND, PLACEBO-CONTROLLED RANDOMISED TRIAL," BY S. PIROTTA, D.J. KIDGELL, AND R.M. DALY (2015)	LEVEL II, DOUBLE-BLIND, RANDOMIZED, PLACEBO-CONTROLLED TRIAL INTENDING "TO INVESTIGATE THE EFFECTS OF VITAMIN D SUPPLEMENTATION ON CORTICOSPINAL EXCITABILITY AND INTRACORTICAL INHIBITION IN OLDER ADULTS WITH INSUFFICIENT SERUM 25(OH)D LEVELS" (PIROTTA, KIDGELL, & DALY, 2015, P. 132).	MUSCLE STRENGTH SIGNIFICANTLY IMPROVED IN THE PARTICIPANTS TAKING VITAMIN D SUPPLEMENTS; HOWEVER, THEY DID NOT SEE ANY SIGNIFICANT DIFFERENCES IN MUSCLE STRENGTH COMPARED TO THE PLACEBO GROUP.
"NO EFFECT OF MONTHLY SUPPLEMENTATION WITH 12000 IU, 24000 IU OR 48000 IU VITAMIN D3 FOR ONE YEAR ON MUSCLE FUNCTION: THE VITAMIN D IN OLDER PEOPLE STUDY," BY R.M.T.K RANATHUNGA, T.R. HILL, J.C. MATHERS, R.M. FRANCIS, A. PRENTICE, I. SCHOENMAKERS, AND T.J. ASPRAY (2018)	LEVEL II, DOUBLE-BLIND, RANDOMIZED CONTROLLED TRIAL TESTING THE EFFECTS OF THREE DIFFERENT DOSES OF VITAMIN D SUPPLEMENTATION ON MUSCLE FUNCTION IN OLDER ADULTS (RANATHUNGA, HILL, MATHERS, FRANCIS, PRENTICE, SCHOENMAKERS, & ASPRAY, 2018).	FOUND NO SIGNIFICANT CHANGES IN GRIP STRENGTH AND LOWER EXTREMITY FUNCTION BETWEEN THE DIFFERING SUPPLEMENTATION GROUPS,
"THE EFFECT OF VITAMIN D SUPPLEMENTATION ON LOWER-EXTREMITY POWER AND FUNCTION IN OLDER ADULTS: A RANDOMIZED CONTROL TRIAL", BY SHEA, FIELDING, AND DAWSON-HUGHES (2019)	LEVEL II, SINGLE-CENTER, DOUBLE-BLIND, RANDOMIZED, PLACEBO-CONTROLLED TRIAL AIMING AT "TESTING THE EFFECTIVENESS OF 12 MO OF VITAMIN D SUPPLEMENTATION ON LOWER EXTREMITY POWER AND FUNCTION IN OLDER COMMUNITY-DWELLING ADULTS SCREENED FOR LOW SERUM 25(OH)D" (SHAE ET AL., 2019, P. 369).	FOUND NO IMPROVEMENT IN LOWER-EXTREMITY POWER IN OLDER ADULTS RECEIVING VITAMIN D SUPPLEMENTATION, COMPARED WITH THOSE WHO RECEIVED THE PLACEBO.
"CHOLECALCIFEROL OR 25-HYDROXYCHOLECALCIFEROL SUPPLEMENTATION DOES NOT AFFECT MUSCLE STRENGTH AND PHYSICAL PERFORMANCE IN PREFRIL AND FRAIL OLDER ADULTS," BY VAES, TIELAND, TOUSSAINT, NILWIK, VERDIJK, VAN LOON, AND DE GROOT (2018)	LEVEL II, DOUBLE-BLIND, RANDOMIZED, PLACEBO-CONTROLLED TRIAL WHICH "INVESTIGATED THE EFFECT OF DAILY SUPPLEMENTATION WITH 25-HYDROXYCHOLECALCIFEROL [25(OH)D <sub>3</sub> ] OR CHOLECALCIFEROL (VITAMIN D <sub>3</sub> ) ON MUSCLE STRENGTH AND PHYSICAL PERFORMANCE IN OLDER ADULTS" (VAES ET AL., 2018, P. 713).	CONCLUDED THAT INCREASING THE SERUM 25(OH)D CONCENTRATION DID NOT CHANGE MUSCLE STRENGTH OR FUNCTION IN PREFRIL AND FRAIL OLDER ADULTS.