

Dementia risk doubles following concussion, UCSF study shows

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By *Suzanne Leigh* [1]



The likelihood of dementia was found to more than double following concussion in a study of more than 350,000 veterans conducted by researchers from UCSF and the San Francisco Veterans Affairs Health Care System.

Dementia should join the expanding list of possible complications following concussion, even if the patient did not lose consciousness, say researchers from UCSF Weill Institute for Neurosciences [2] and the San Francisco Veterans Affairs Health Care System [3].

In their study, which tracked more than one-third of a million veterans, the likelihood of dementia was found to more than double following concussion, the researchers reported in the May 7, 2018 online edition of *JAMA Neurology* [4].



“Our results show that more needs to be done to reduce the likelihood of traumatic brain injuries,” said study co-author Deborah Barnes, PhD, MPH [5].

After adjusting for age, sex, race, education, and other health conditions, they found that concussion without loss of consciousness led to 2.36 times the risk for dementia. These risks were slightly elevated for those in the loss-of-consciousness bracket (2.51) and were nearly four times higher (3.77) for those with the more serious moderate-to-severe traumatic brain injury.

Concussions in general population also risky for dementia

Researchers identified participants from two databases: one listing all-era veterans whose traumatic brain injuries — which includes concussion or mild traumatic brain injury — could have occurred during civilian or military life; and the second from vets serving in Iraq and Afghanistan, for whom most of these injuries had occurred in combat zones, such as from shockwaves in blasts.

“The findings in both groups were similar, indicating that concussions occurring in combat areas were as likely to be linked to dementia as those concussions affecting the general population,” said first author Deborah Barnes, PhD, MPH [5], professor in the UCSF departments of psychiatry, and epidemiology and biostatistics.

In total, 357,558 participants, whose average age was 49, were tracked. Half had been diagnosed with traumatic brain injury, of which 54 percent had had concussion. The study followed participants for an average of 4.2 years; 91 percent were male and 72 percent were white.

Among Iran and Afghanistan vets, concussion was defined as mild traumatic brain injury resulting in alteration of consciousness and amnesia for one day or less, based on a comprehensive medical evaluation. In the other vets, concussion was defined using a wide list of diagnostic codes in the electronic health record.

Trauma may hasten neurodegenerative disorders

“There are several mechanisms that may explain the association between traumatic brain injury and dementia,” said senior author and principal investigator Kristine Yaffe, MD [6], professor in the UCSF departments of neurology, psychiatry, and epidemiology and biostatistics. “There’s something about trauma that may hasten the development of neurodegenerative conditions. One theory is that brain injury induces or accelerates the accumulation of abnormal proteins that lead to neuronal death associated with conditions like Alzheimer’s disease.”



Kristine Yaffe, MD [6]

“It’s also possible that trauma leaves the brain more vulnerable to other injuries or aging processes,” said Yaffe, “but we need more work in this area.”

The study’s results add to a volume of research that links concussion and other traumatic brain injuries to various psychiatric and neurodegenerative disorders. Last month, UCSF researchers reported a link between concussion and Parkinson’s disease [7].

“Our results show that more needs to be done to reduce the likelihood of traumatic brain injuries,” said Barnes. “In older adults, exercise and multifactorial interventions may limit the risks of falls, which are a leading cause of head injury.”

“For those who experience a concussion, get medical attention, allow time to heal and try to avoid repeat concussions. Although our study did not directly examine this issue, there is growing evidence that repeated concussions appear to have a cumulative effect.”

The study is supported by funding from the U.S. Army Medical Research and Material Command and from the U.S. Department of Veteran Affairs (Chronic Effects of Neurotrauma Consortium).

Co-authors are Amy Byers, PhD, MPH [8]; Raquel Gardner, MD [9]; Karen Seal, MD, MPH [10]; and W. John Boscardin, PhD [11], all of UCSF and the San Francisco Veterans Affairs Health Care System.

Read the paper

- **JAMA Neurology:** Association of Mild Traumatic Brain Injury With and Without Loss of Consciousness With Dementia in US Military Veterans [4]

Further coverage

- **San Francisco Chronicle:** Even milder concussions double dementia risk, UCSF study finds [12]
- **Los Angeles Times:** In veterans, even a mild case of traumatic brain injury is linked to an increased risk of dementia [13]
- **Quartz:** A single traumatic brain injury may double the risk of dementia [14]

About UCSF Psychiatry

The UCSF Department of Psychiatry [15] and the Langley Porter Psychiatric Institute are among the nation’s foremost resources in the fields of child, adolescent, adult, and geriatric mental health. Together they constitute one of the largest departments in the UCSF School of Medicine and the UCSF Weill Institute for Neurosciences, with a mission focused on research (basic, translational, clinical), teaching, patient care and public service.

UCSF Psychiatry conducts its clinical, educational and research efforts at a variety of

locations in Northern California, including UCSF campuses at Parnassus Heights, Mission Bay and Laurel Heights, UCSF Medical Center, UCSF Benioff Children's Hospitals, Zuckerberg San Francisco General Hospital and Trauma Center, the San Francisco VA Health Care System and UCSF Fresno.

About the UCSF Weill Institute for Neurosciences

The UCSF Weill Institute for Neurosciences ^[16], established by the extraordinary generosity of Joan and Sanford I. "Sandy" Weill, brings together world-class researchers with top-ranked physicians to solve some of the most complex challenges in the human brain.

The UCSF Weill Institute leverages UCSF's unrivaled bench-to-bedside excellence in the neurosciences. It unites three UCSF departments—Neurology, Psychiatry, and Neurological Surgery—that are highly esteemed for both patient care and research, as well as the Neuroscience Graduate Program, a cross-disciplinary alliance of nearly 100 UCSF faculty members from 15 basic-science departments, as well as the UCSF Institute for Neurodegenerative Diseases, a multidisciplinary research center focused on finding effective treatments for Alzheimer's disease, frontotemporal dementia, Parkinson's disease, and other neurodegenerative disorders.

About UCSF

UC San Francisco (UCSF) ^[17] is a leading university dedicated to promoting health worldwide through advanced biomedical research, graduate-level education in the life sciences and health professions, and excellence in patient care. It includes top-ranked graduate schools of dentistry, medicine, nursing and pharmacy; a graduate division with nationally renowned programs in basic, biomedical, translational and population sciences; and a preeminent biomedical research enterprise. It also includes UCSF Health, which comprises top-ranked hospitals — UCSF Medical Center ^[18] and UCSF Benioff Children's Hospitals in San Francisco ^[19] and Oakland ^[20] — and other partner and affiliated hospitals and healthcare providers throughout the Bay Area.

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