

**Case Report: Callosal disconnection syndrome manifesting as mixed frontal-callosal-posterior alien hand syndrome following extensive corpus callosum infarct [version 1; peer review: awaiting peer review]**

**ABSTRACT**

Alien hand syndrome (AHS) is a rare neurological phenomenon first described by Goldstein over a century ago. The most widely recognized variants in literature are frontal, callosal, and posterior AHS. AHS due to the corpus callosum lesion can occur alone or as part of callosal disconnection syndrome (CDS). This report presents a unique CDS case manifesting clinical features from all three AHS variants, resulting from an extensive corpus callosum infarct. Our patient exhibited various clinical features from the three AHS variants, which include grasping, groping, and difficulty releasing objects from the hand (anterior); intermanual conflict (callosal); arm levitation, mild hemiparesis, and hemisensory loss (posterior). Additionally, the extensive disruption of the corpus callosal fibers produced neurological manifestations of CDS, such as cognitive impairment, ideomotor and constructional apraxia, behavioral disorder, and transcortical motor aphasia. We employed a range of rehabilitation interventions, such as mirror box therapy, limb restraint strategy, verbal cue training, cognitive behavioral therapy, bimanual hand training, speech and language therapy, and pharmacological treatment with clonazepam. The patient showed almost complete resolution of CDS and AHS features by nine months post-stroke. Our case report highlights distinctive clinical variations of AHS and the challenging correlation between clinical manifestations and neuroanatomical substrates. Future studies are necessary to explore the intricate neural connections and the precise function of the corpus callosum. This can be achieved by combining comprehensive neuropsychological testing with diffusion tensor tractography studies. It is also essential to develop a validated tool to standardize AHS assessment. Finally, the scarcity of evidence in rehabilitation interventions necessitates further studies to address the wide knowledge gap in AHS and CDS management.