A knot $K$ is called $n$-adjacent to another knot $K'$, if $K$ admits a projection containing $n$ “generalized crossings” such that changing any $0 < m \leq n$ of them yields a projection of $K'$. We apply techniques and results from the theory of sutured 3-manifolds, Dehn surgery and the theory of 3-manifold mapping class groups to answer the question of the extent to which non-isotopic knots can be adjacent to each other. A consequence of our main result is that if $K$ is $n$-adjacent to $K'$ for all $n \in \mathbb{N}$, then $K$ and $K'$ are isotopic. This provides a partial verification of the conjecture of V. Vassiliev that the finite type knot invariants distinguish all knots.