The geometric, energetic, and electronic properties of metal-supported metal clusters were examined computationally by applying a method based on density functional theory to model systems. To explore lattice strain effects on these systems, Pt-3 and Pd-3 clusters adsorbed on Au(111) and Cu(111) were studied. The geometric and electronic properties of these small metal-supported clusters were found to differ from the corresponding overlayer system. The d-band centers of the adsorbed clusters on Au(111) were calculated to be very similar to those of the adsorbed clusters on Cu(111), indicating that the support has only a minor effect on the d-band center of the adsorbed clusters. In contrast, the gap between the local d-band centers of Pt and Pd overlayers and the Fermi energy is reduced from -2.41 eV (Pt) and -2.10 eV (Pd) on Cu(111) to -1.41 eV (Pt) and -1.22 eV (Pd) on Au(111).