We theoretically study the carrier density dependences of optical properties of closely stacked InAs/GaAs one-dimensional quantum dot superlattices based on the eight-band k·p theory. We find that the phonon assisted carrier injection into the ground state of both conduction and valence minibands is possible for small interdot spacings. We also predict that optical gain and spontaneous emission spectra show strongly anisotropic characters and can be controlled between [001]-, [110]-, [1 1 0]-polarization by injected carrier densities as well as interdot spacing. Our findings reveal interesting possibilities of quantum dot-based optoelectronic devices applications.