1 Jacobi Fields

Consider M a Riemannian manifold, $p \in M$. Let Ω be the maximal domain of the exponential map $\exp_p$. We wish to understand what happens to the image of a ball under the exponential map (which is a diffeo for small balls, but what about larger ones?). In essence, where is the exponential map a local diffeomorphism? Or, where is $d\exp_p$ an isomorphism? For what u is $(d\exp_p)_u : T_u T_p M \cong T_p M \to T_{\exp_p(u)} M$ an isomorphism? This is true if and only if the kernel is trivial.