Let $f$ be a rational endomorphism of a complex algebraic surface $X$, and suppose that $f$ has a fixed point $x$. Analyzing the dynamics of $f$ near such a fixed point is often an essential step in understanding the global dynamical behavior of $f$ on $X$. In this talk, I will describe a nonarchimedean approach to analyzing the local dynamics in the case when $f$ is noninvertible near $x$. Instead of considering directly the dynamics of $f$ near $x$ in $X$, we will instead equip the field of complex numbers with the trivial absolute value and study the local dynamics of $f$ near $x$ in the corresponding Berkovich analytification of $X$. This will allow us to understand the dynamics of $f$ on certain birationally equivalent models of $X$, and in turn deduce concrete information about the original (archimedean) dynamical system. Our main application is that one can almost always find modifications of $X$ over $x$ on which $f$ exhibits a desirable "algebraic stability" property. (Received September 22, 2015)