Could we see neutron star oscillations after a pulsar glitch?

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The pulsar "standard model" of a rotating magnetized conducting sphere surrounded by a plasma is generalized in its essential parts for the case of an oscillating star. The Goldreich-Julian charge density, electromagnetic energy losses, as well as the polar cap scenario of particle acceleration are considered. Despite similarities, there are substantial differences between magnetospheres of rotating and oscillating stars. For example, the energy losses of an oscillating star substantially differ from those given by the vacuum formulas. The main attention in this work is drawn to the distortion of the pulsar magnetosphere by neutron star oscillations. The changes in the the Goldreich-Julian charge density due to star pulsations with high harmonic numbers (l, m) could be large, leading to a strong distortion of accelerating electric field near the pulsar polar cap. This results in remarkable changes of individual pulse profiles of radio pulsars. It is shown, that in a moderately optimistic scenario for the excitation of neutron star oscillations by a glitch, such changes in the pulsar radiation could be detected by contemporary radio telescopes.