Our objective is to evaluate the clinical and radiographic effectiveness of bioabsorbable polylactic acid barrier membrane impregnated with doxycycline (Atrisorb-D) in treating peri-implant dehiscence defects. Three implant-supported partial overdenture wearers with bilateral implant dehiscence defects were enrolled in the study. A full-thickness mucoperiosteal flap was elevated, granulation tissue was debrided, the membrane was custom made and adapted to cover the dehiscence defects. Clinical and radiographic measurements were taken at baseline 3 and 6 months intervals. The results showed significant bone gain at the dehiscence defect as well as a significant reduction in the peri-implant probing pocket depth.