Biological factors contributing to failures of osseointegrated oral implants. (I). Success criteria and epidemiology.

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The aim of this review was to offer a critical evaluation of the literature and to provide the clinician with scientifically-based diagnostic criteria for monitoring the implant condition. The review presents the current opinions on definitions of osseointegration and implant failure. Further, distinctions between failed and failing implants are discussed together with the presently used parameters to assess the implant status. Radiographic examinations together with implant mobility tests seem to be the most reliable parameters in the assessment of the prognosis for osseointegrated implants. On the basis of 73 published articles, the rates of early and late failures of Brånemark implants, used in various anatomical locations and clinical situations, were analyzed using a metanalytic approach. Biologically related implant failures calculated on a sample of 2,812 implants were relatively rare: 7.7% over a 5-year period (bone graft excluded). The predictability of implant treatment was remarkable, particularly for partially edentulous patients, who showed failure rates about half those of totally edentulous subjects. Our analysis also confirmed (for both early and late failures) the general trend of maxillas, having almost 3 times more implant losses than mandibles, with the exception of the partially edentulous situation which displayed similar failure rates both in upper and lower jaws. Surgical trauma together with anatomical conditions are believed to be the most important etiological factors for early implant losses (3.60% of 16,935 implants). The low prevalence of failures attributable to peri-implantitis found in the literature together with the fact that, in general, partially edentulous patients have less resorbed jaws, speak in favour of jaw volume, bone quality, and overload as the three major determinants for late implant failures in the Brånemark system. Conversely, the ITI system seemed to be characterized by a higher prevalence of losses due to peri-implantitis. These differences may be attributed to the different implant designs and surface characteristics. On the basis of the published literature, there appears to be a number of scientific issues which are yet not fully understood. Therefore, it is concluded that further clinical follow-up and retrieval studies are required in order to achieve a better understanding of the mechanisms for failure of osseointegrated implants.