One of the hottest topics in implant dentistry at the moment is the issue of bacterial-induced peri-implantitis. This affects a substantial number of dental implants worldwide.

Peri-implantitis in this context means progressive marginal bone loss, together with infection signs which could jeopardise implant survival. There have been a substantial number of consensus conferences, systematic reviews, trials, human and animal studies on this topic over the last few years. This article asks whether we can trust all their findings.

The major areas of research into peri-implantitis can be broadly grouped into four themes:

1. Incidence and prevalence of peri-implantitis with its associated etiological factors. The ideal study designs to explore these aspects are cross-sectional surveys and, even better, prospective cohort studies. While there are several epidemiological studies in this field, only a few properly designed prospective cohort studies have been conducted. Researchers should use the most reliable study designs to achieve reliable results. Knowledge of the principal factors associated with peri-implantitis, based on reliable epidemiological data, would represent a very useful tool in developing effective preventative measures.

2. Diagnostic tests. This interesting line of research looks at the development of reliable diagnostic tools for screening specific populations to identify peri-implantitis as early as possible. Ideally, these tests should be both valid (capable of providing accurate results) and reliable (capable of delivering accurate results consistently). If the disease is identified sooner, less treatment will be required and the prognosis of the affected implants will be better. Unfortunately, no reliable diagnostic test has been identified so far.

3. Prevention of peri-implantitis. This line of research is concerned with how to effectively prevent peri-implantitis. If effective solutions can be found, it is arguably the most important theme. It would involve focusing research on several areas:

   - designing implants with surfaces that are less prone to peri-implantitis. For instance, it is widely believed (and there is also some supporting evidence) that implants with surfaces that are too ‘rough’ (eg titanium plasma-sprayed) lead to a higher risk of peri-implantitis
   - controlling those factors associated with peri-implantitis (poor oral hygiene; prosthetic design; smoking; residual submucosal cement etc.)
   - identifying effective maintenance programmes

The best way to answer these questions would be to compare alternative solutions using randomised controlled trials (RCTs). Unfortunately, no such trials have been conducted so far.

4. Treatment of peri-implantitis. Many different therapeutic protocols have been presented for the treatment of peri-implantitis and some have also been evaluated with RCTs. However the results (for instance as summarised in a recent Cochrane review) suggest that none of the tested therapies have shown convincingly better results than a simple conventional debridement of the plaque biofilm present on the implant surface. More properly conducted research is needed in this area, though there are several ongoing projects.

When reviewing research data relating to peri-implantitis there are a number of additional factors to take into account:

1. The role of animal studies. Scientific journals are literally flooded with animal studies which have been conducted using insignificant sample sizes (4 to 8 animals). They involve creating completely artificial diseases around non-loaded implants in a few healthy animals. Some authors speculate wildly using data which may be based on one implant failing in a single dog. The role of animal studies is very slight and can be extremely misleading, particularly if there is a ‘secret agenda’ to extrapolate data to the clinical situation. Unfortunately these types of studies are widely abused in an attempt to extrapolate data to the human situation.

2. Trial duration. Peri-implantitis is a chronic disease which can develop many years after implantation. Its recurrence is common even after repeated treatments.
3. Commercial sponsorship. The great majority of the RCTs so far conducted to evaluate the effectiveness of therapies for the treatment of peri-implantitis were sponsored by companies willing to test their products (ie to show how good they are). Examples of products tested include local antibiotics, lasers and sophisticated devices for mechanical debridement. Companies that are serious about advancing scientific research will also publish any data that shows no effect. Those that are less serious may try to stop publication of data or sabotage the continuation of the trial. We have already experienced this when the largest ever multicenter RCT to be conducted failed to show any clinical relevant effect using light activated therapy as adjunct therapy to mechanical debridement, to the point where contracts were revisited. We really need more independent trials and companies that are prepared to act as serious partners if we want to understand the best way to deal with peri-implantitis (as with any other disease).

I wish to conclude by citing DG Altman, who in 1994 elegantly summarised what was required: ‘We need less research, better research, and research done for the right reasons’. In 2013 very little has changed and we still have exactly the same needs. What should we do to finally improve our knowledge? It is very simple. We need to demand high-quality research, and we should not waste our time in either conducting or reading about poorly conducted and misleading research. Is this possible? The answer depends on us.