Welcome to the newest feature of Inspyred. Our editorial committee have been scouring the leading journals in implant dentistry, and have hand-picked their favourite articles to share with you. You'll find a selection of the most interesting and cutting-edge research papers in the current literature. Get the low-down on the latest research, and read our tips for which articles to look out for.

This meta-analysis assessed the clinical performance of Nobel Biocare’s TiUnite implant surface. It put 106 publications which met the inclusion criteria (out of 32,519) under the microscope, and found high survival rates for all implant designs associated with TiUnite, as well as promising marginal bone levels.

Nevertheless, the authors interpreted their findings cautiously. Because the analysis focused on implant surface, all conventional implant types in the TiUnite portfolio were included. Consequently, several selection criteria used in prospective clinical trials (differences in implant geometry, thread design, implant abutment connection, and cervical texture) were found to be problematic. This is because clinicians generally do not use the entire implant portfolio in a single study; nevertheless, this best reflects daily clinical practice.

What’s also interesting about this article is that peri-implantitis was only scored when reported during primary research (despite the fact that they used different parameters). Furthermore, although most of the qualifying papers defined peri-implantitis as increased probing depth or bleeding on probing, these diagnostic criteria have themselves been questioned. The paper reported similar rates of peri-implantitis with TiUnite implants as those reported for sand-blasted, large-grit and acid-etched implant surfaces. In a retrospective analysis, the prevalence of peri-implantitis was 1.8% in a cohort of 303 orally healthy patients (511 implants).

This in-depth study holds up under scrutiny, and represents the highest level of evidence available in science. This in-depth study holds up under scrutiny, and represents the highest level of evidence available in science. It provides reference values for implant survival rates and marginal bone levels, and is a valuable resource for evaluating alternative implant brands.
You’ve heard it before: patient-related outcome measures (PROMs) and experience measures (PREMs) are key for assessing clinical outcomes and improving patient care. But how do you find good quality evidence which also covers PROMs?

The good news is that when it comes to digital versus conventional impressions, Gallardo et al. have done most of the hard work. For their systematic review, the authors conducted a search of five electronic databases, identifying a total of 2,943 papers published between 1955 and 2016. Of these, five met the inclusion criteria.

One paper reported no difference between digital and conventional impression techniques in terms of patient comfort. The other four found that the digital technique was more comfortable and caused less anxiety and nausea for patients. However, when it came to procedure times, it was less clear-cut: two studies found that the conventional method was quicker, while the other three reported that the digital technique took less time.

The authors concluded that patients tend to prefer digital over conventional techniques. So if you are looking to improve your patients’ experiences and considering moving to a digital workflow, this could be the paper which persuades you to take that leap!

In general, implant therapy is a very predictable treatment modality. High success rates can be achieved as long as strict treatment protocols and patient-selection criteria are observed. In reality, however, technical and biological complications can still occur. And in fact, many research groups have reported dramatically high complication rates. Of these, implant fracture is undoubtedly the most catastrophic. It requires complex procedures to treat and is associated with higher patient morbidity.

A research group led by Chrcanovic et al. assessed the prevalence of implant fracture together with associated risk factors. They collected data from 2,760 patients and a total of 10,099 dental implants, and reviewed the performance of implants placed over a period of 34 years. They found that 44 of the 10,099 implants fractured, with five main factors that had a statistically significant influence on implant fracture. These were: grades of titanium, bruxism, position of the dental implant in relation to a cantilever of the prosthetic superstructure and changes in implant length and width dimensions.

The magnitude of the study provides an invaluable overview of the evidence. The article offers clear and transparent information about the risk factors associated with implant fracture. Studies like this provide clinicians with a touchstone for minimising and potentially even eliminating risk factors in their daily practice.
Clay is cool. It's one of nature's best kept secrets, and some kinds are used for their nutritional properties. In Peru, parrots eat clay to get sodium which their young require; in Uganda, chimps eat clay to boost their mineral intake. And guess what: our patients could also benefit from clay (although you don't have to prescribe geophagy, which is the practice of eating soil).

In addition to the established uses of clay as a drug delivery modifier or mechanical property enhancer, certain kinds of clay have been shown to be useful as bioactive additives. These clays can enhance cellular functions like adhesion, proliferation and differentiation, and most notably, osteogenesis. Even though the mechanism remains poorly understood, it could be of great interest to improve our bone regeneration procedures.

Check out this enlightening article to find out what exciting uses clay could have in store for your practice!

And there's also good news for those of you who prefer to prescribe titanium. The battle for the best titanium-based implant surface continues. Stepping up to the plate: a Sino-Australian team who have evaluated the in vitro and in vivo effects of heat-based annealing after construction of a microporous titanium dioxide coating on titanium implant surfaces.

In vitro experiments revealed that the MAO-650 coating enabled favourable osteoimmunomodulation and inhibited the inflammatory response of macrophages. The in vivo evaluation showed that MAO-650 improved osseointegration compared to the MAO coating without annealing.

So, I'm guessing that the question on everybody's lips is: how long before we can assess the effect of a clay nanoparticle coating annealed on titanium implant surfaces?

Well, you can count on us to not keep it secret…
If you want to get a better understanding of bone volume, you have to look deeper. This article does just that. The authors of the study assessed the effect of particle size and type by comparing different bone substitute materials (biphasic β-tricalcium phosphate with hydroxyapatite (alloplast) versus allograft) used in ridge split procedures. In the two treatment groups, different particle sizes were used: small (0.25–1mm) and large (1–2mm).

So what’s the big deal with big particle sizes?

And the results are in: the study found that alloplastic materials achieved better levels of ridge width gain. On average, large alloplastic particles had a mean ridge width gain of 4.40 ± 0.24mm; small alloplastic particles had 3.52 ± 0.59mm. Large allograft particles: 3.82 ± 0.19mm; small allograft particles: 2.57 ± 0.16mm. What is even more interesting is that large particle sizes consistently achieved significantly higher ridge width at the time of implant placement.

So what’s the big deal with big particle sizes? For clinicians, the choice is clear: larger particles seem to get better outcomes. They offer more ridge width gain, which in turn can lead to better results.

This RCT investigated whether minimally rough (Sa 0.20 ± 0.02) implant surfaces could achieve better outcomes than moderately rough (Sa 1.44 ± 0.02) surfaces in patients with a history of severe periodontitis.

In a prospective randomised controlled clinical trial, 48 minimally (Tur) and moderately (TiU) rough implants were placed in 18 patients using a split-mouth protocol. There were two sub-groups: one group (n = 10) of patients had had all their teeth extracted due to severe periodontitis and the second (n = 8) had teeth in the antagonistic jaw with a history of periodontitis.

The authors found that partially edentulous patients with a history of severe periodontitis were at higher risk of developing peri-implantitis. In partially edentulous patients, moderately rough surfaces showed more bone loss than Tur surfaces. The minimally rough surfaces in these patients had lower survival rates due to early failures, but otherwise showed more favourable clinical results. On a microbiological level, moderately rough surfaces showed more pathogenic microbiota, but this was not statistically significant.

So how rough is too rough?

So how rough is too rough? The authors concluded that for patients with a history of severe periodontitis, minimally rough implants had more favourable clinical parameters after 5 years of loading compared to moderately rough implants.